

וַיֵּרָא

Et vidit Deus lucem

quod esset bona



SYLVA SYLVARVM
OR
A NATURALL HISTORY
In ten Centuries.
Written by the right Hon^{ble} Francis
Lo: Verulam Viscount S^t Alban.
Published after y^e Autho^rs Death
by W. RAWLEY D^r of Divi
nity. &c

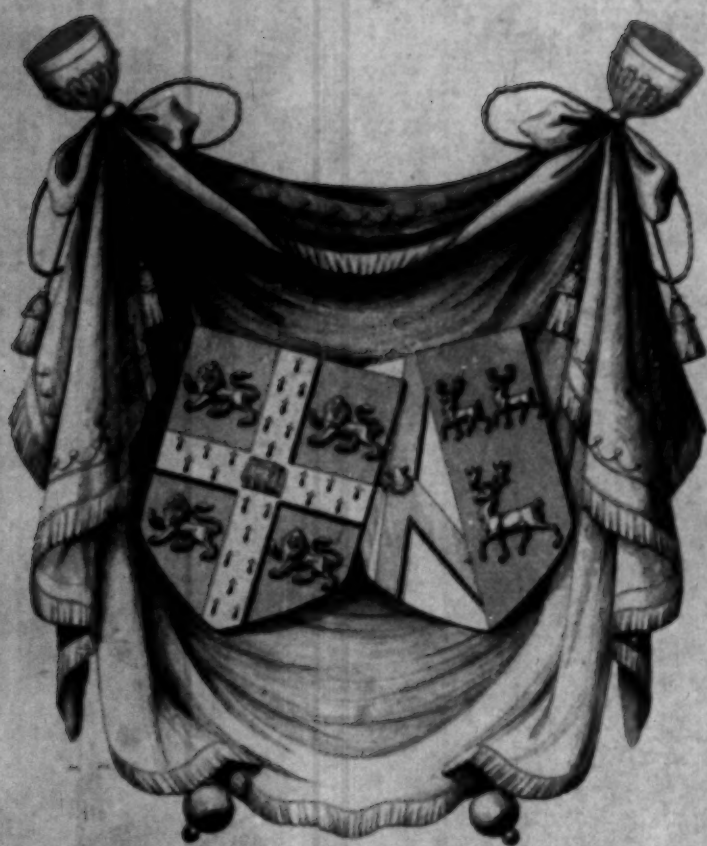
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SYLVA ^{XVII. 29. 5}
^{LE. 24. 25.}
SYLVARVM:

O. R.

A Naturall Historie.

IN TEN CENTURIES.

WRITTEN BY THE RIGHT
Honourable FRANCIS Lo. Verulam
Viscount *St. ALBAN.*

Published after the Authors death,
By WILLIAM RAWLEY Doctor of Divinitie,
late his Lordships Chaplaine.



LONDON,
Printed by *J. H.* for *William Lee* at the *Turks*
Head in *Fleet-street*, next to the *Miter.* 1627.

A Natural History.

IN THE COURT OF COMMONS

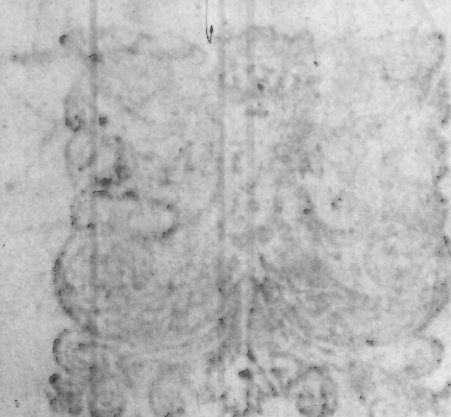
WRITTEN BY THE RIGHT

Handwritten text (likely bleed-through from the reverse side):
Honorable F. R. A. C. 14. 14. 14.

MA 1123 3000 N.Y.

late Sir Joseph Banks Bart.

James W. L. of the City of New York



MONDO

Printed by J. H. for William Lee at the Turk's

There is a lot of work to be done.



TO THE MOST HIGH
AND MIGHTY PRINCE
CHARLES,
BY THE GRACE OF GOD,
King of *Great Britaine, France, and*
Ireland, Defender of the Faith, &c.

May it please your most Excellent Maiestie;



He whole Body of the *Natu-
rall Historie*, either designed,
or written, by the late *Lo.
Viscount S. Alban*, was dedica-
ted to your *Maiestie*, in his
Booke De Ventis, about foure
yeeres past, when your *Maiestie* was *Prince*: So
as there needed no new Dedication of this
Worke, but only, in all humblenessse, to let your
Maiestie know, it is yours. It is true, if that *Lo.*
had liued, your *Maiestie*, ere long, had beene
inuoked, to the Protection of another *Historie*;
Whereof,

The Epistle Dedicatory.

Whereof, not *Natures Kingdome*, as in this, but these of your *Maiesties*, (during the Time and *Raigne* of *King Henry the Eighth*) had beene the Subiect: Which since it died vnder the Designation meere,ly, there is nothing left, but your *Maiesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions; who was willing to haue parted; for a while, with his Darling *Philosophie*, that hee might haue attended your Royall Commandement, in that other *Worke*. Thus much I haue beene bold, in all lowlinesse, to represent vnto your *Maiestie*, as one that was trusted with his *Lordships Writings*, euen to the last. And as this *Worke* affecteth the *Stampe* of your *Maiesties* Royall Protection, to make it more currant to the *World*; So vnder the Protection of this *Worke*, I presume in all humblenesse to approach your *Maiesties* presence; And to offer it vp into your *Sacred Hands*.

Your **MAIESTIES** most Loyall

and Devoted Subiect,

W. RAWLEY.



To the Reader.



Having had the Honour to be continually with my *Lord*, in compiling of this *Worke*; And to be employed therein; I haue thought it not amisse, (with his Lordships good leaue and liking,) for the better satisfaction of those that shall reade it, to make knowne somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I haue heard his Lordship often say; that if hee should haue serued the glory of his owne Name, he had been better not to haue published this *Naturall History*: For it may seeme an Indigested Heap of Particulars; And cannot haue that Lustre, which Bookes cast into Methods haue: But that hee resolved to preferre the good of Men, and that which might best secure it, before any thing that might haue Relation to Himselfe. And hee knew well, that ther was no other way open, to vnloose Mens mindes, being bound; and (as it were) Maleficiate, by the Charmes of deceiuing Notions, and Theories; and thereby made

A

Impo-

To the Reader.

Impotent for Generation of *VVorkes*; But onely
no wher to depart from the Sense, and cleare ex-
perience; But to keepe close to it, especially in the
beginning: Besides, this *Naturall History* was a
Debt of his, being Designed and set downe for a
third part of the *Instauration*. I haue also heard
his Lordship discourse, that Men (no doubt)
will thinke many of the *Experiments* contained in
this *Collection*, to bee *Vulgar* and *Triuiall*;
Meane and *Sordid*; *Curious* and *Fruitleffe*: And
therfore he wisheth, that they would haue perpe-
tually before their Eyes, what is now in doing;
And the Difference betweene this *Naturall Hi-*
story, and others. For those *Naturall Histories*,
which are Extant, being gathered for Delight and
Vse, are full of pleasant Descriptions and Pictures;
and affect and seeke after Admiration, Rarities,
and Secrets. But contrariwise, the Scope which
his Lordship intendeth, is to write such a *Natu-*
rall History, as may be Fundamentall to the Ere-
cting and Building of a true *Philosophy*: For the
Illumination of the *Vnderstanding*; the Extracting
of *Axiomes*; and the producing of many Noble
Works, and *Effects*. For he hopeth, by this meanes,
to acquit Himselfe of that, for which hee taketh
Himselfe in a sort bound; And that is, the Ad-
uancement of all Learning and Sciences. For ha-
uing in this present *VVorke* Collected the Ma-
terialls for the Building; And in his *Novum*
Organum (of which his Lordship is yet to publish
a Second

a Second Part,) set downe the Instruments and Directions for the Worke; Men shall now bee wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalfe, I haue heard his Lordship speake complainingly; That his Lordship (who thinketh hee deserueth to be an Architect in this building,) should be forced to be a Work-man and a Labourer; And to digge the Clay, and burne the Brick; And more then that, (according to the hard Condition of the *Israeletes* at the latter end) to gather the Strawe and Stubble, ouer all the Fields, to burn the Bricks withall. For he knyeweth, that except hee doe it, nothing will be done: Men are so sett to despise the Meanes of their owne good. And as for the *Basenes* of many of the Experiments; As long as they be Gods Works, they are Honourable enough. And for the *Vulgarnes* of them; true *Axiomes* must be drawne from plaine Experience, and not from doubtfull; And his Lordships course is, to make VVonders Plaine, and not Plaine things VVonders; And that Experience likewise must be broken and grinded, and not whole, or as it groweth. And for *Vse*; his Lordship hath often in his Mouth, the two kindes of Experiments; *Experimenta Fructifera*, and *Experimenta Lucifera*: Experiments of *Vse*, and Experiments of *Light*; And he reporteth himself, whether he were not a strange Man, that should thinke that

To the Reader.

Light hath no Vse, because it hath no Matter. Further, his Lordship thought good also, to add vnto many of the *Experiments* themselves, some *Glosse* of the *Causes*; that in the succeeding work of *Interpreting Nature*, and *Framing Axiomes*, all things may be in more Readines. And for the *Causes* herein by Him assigned; his Lordship perswadeth Himselfe, they are farr more certaine, then those that are rendred by Others; Not for any Excellency of his owne *VVitt*, (as his Lordship is wont to say) but in respect of his continuall Conuersation with *Nature*, and *Experience*. He did consider likewise, that by this Addition of *Causes*, Mens mindes (which make so much hast to find out the *Causes* of things;) would not think themselves vtterly lost, in a Vast *VVood* of *Experience*, but stay vpon these *Causes*, (such as they are) a little, till true *Axiomes* may be more fully discouered. I haue heard his Lordship say also, that one great Reason, why he would not put these Particulars into any exact *Method*, (though he that looketh attentiuely into them, shall finde that they haue a secret Order) was, because hee conceiued that other men would now thinke, that they could doe the like; And so goe on with a further Collection: which if the *Method* had been Exact, many would haue despaired to attaine by Imitation. As for his Lordships loue of Order, I can referr any Man to his Lordships Latine Booke, *De Augmentis Scientiarum*; which

To the Reader.

which (if my Iudgment be any thing) is written in the Exactest Order, that I know any Writing to bee. I will conclude with an vsuall Speech of his Lordships. That this Worke of his *Naturall History*, is the *World*, as GOD made it, and not as Men haue made it ; For that it hath nothing of Imagination.

This Epistle is the same, that should haue been prefixed to this Booke, if his Lordship had liued.

W: Rawley.

This is a copy of the original manuscript of the book of the life of the late John Smith, Esq. of the County of Middlesex, who died the 10th day of the month of March, 1781, in the 71st year of his age. The manuscript was written by the late John Smith, Esq. and is now in the possession of the late John Smith, Esq. of the County of Middlesex, who died the 10th day of the month of March, 1781, in the 71st year of his age.

THE HISTORY OF THE
LIFE OF THE LATE JOHN SMITH, ESQ.
OF THE COUNTY OF MIDDLESEX, WHO DIED THE 10TH DAY OF THE MONTH OF MARCH, 1781, IN THE 71ST YEAR OF HIS AGE.

HISTORIE

1. CHURCH

TO THE READER. I have the honor to inform you, that the following is a copy of the original manuscript of the book of the life of the late John Smith, Esq. of the County of Middlesex, who died the 10th day of the month of March, 1781, in the 71st year of his age. The manuscript was written by the late John Smith, Esq. and is now in the possession of the late John Smith, Esq. of the County of Middlesex, who died the 10th day of the month of March, 1781, in the 71st year of his age.

THE HISTORY OF THE
LIFE OF THE LATE JOHN SMITH, ESQ.
OF THE COUNTY OF MIDDLESEX, WHO DIED THE 10TH DAY OF THE MONTH OF MARCH, 1781, IN THE 71ST YEAR OF HIS AGE.



NATVRALL HISTORIE.

I. Century.

DIGG a *Pitt* vpon the *Seashore*, somewhat above the High-water Marke, and sincke it as deepe as the Low-Water marke; And as the *Tide* commeth in, it will fill with *Water*, Fresh and Potable. This is commonly practized vpon the Coast of *Barbary*, where other fresh *Water* is wanting. And *CÆSAR* knew this well, when he was besieged in *Alexandria*: For by Digging of *Pitts* in the *Seashore*, hee did frustrate the Laborious Workes of the Enemies, which had turned the *Sea-Water* vpon the Wells of *Alexandria*; And so saued his Army, being then in Desperation. But *Cesar* mistooke the Cause; For he thought that all *Sea-Sandes* had Naturall Springs of *Fresh Water*. But it is plaine, that it is the *Sea-Water*; because the *Pitt* filleth according to the Measure of the *Tide*: And the *Sea water* passing or Straining through the *Sandes*, leaueth the Saltnesse.

I remember to haue Read, that Triall hath beene made of *Salt Water* passed through *Earth*; through Tenn Vessells, one within an other, and yet it hath not lost his Saltnesse, as to become potable: But the same Man saith, that (by the Relation of Another,) *Salt Water* drained through twenty Vessells, hath become Fresh. This *Experiment* seemeth to crosse that other of *Pitts*, made by the *Sea-side*; And yet but in part, if it be true, that twentie Repetitions doe the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common course of *Experiments*, except they be led by great Iudgement, and some good Light of *Axiomes*. For first, ther is no small difference betweene a
Passage

Experiments
in *Consort*,
touching the
Straining and
Passing of Bo-
dies, one
through ano-
ther: which
they Call *Per-
colation*.

Passage of *Water* through twenty small Vessells; And through such a distance, as betweene the Low water, and High water Marke. Secondly, there is a great difference betweene Earth and Sand: For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides Earth doth not straine the *Water* so finely, as Sand doth. But ther is a Third Point, that I suspect as much, or more, then the other Two: And that is, that in the *Experiment* of *Transmission* of the *Sea-water* into the *Pitts*, the *Water* riseth; But in the *Experiment* of *Transmission* of the *Water* through the Vessells, it falleth: Now certaine it is, that the Salter Part of *Water*, (once Salted throughout) goeth to the Bottom. And therefore no meruaile, if the Draining of *Water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the very Dashing of the *Water*, that commeth from the Sea, is more proper to strike of the Salt part, then wher the *Water* slideth of her owne Motion.

It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*,) is a good kinde of *Separation*; Not onely of Thicke from Thin, and Grosse from Fine; But of more subtile Natures; And varieth according to the Bodie through which the *Transmission* is made: As if through a wollen Bagg, the Liquour leaueth the Fatnesse; It through Sand, the Saltnesse; &c. They speake of Seuering Wine from Water, passing it through Iuy wood, or through other the like porous Body; But *Non Constat*.

The *Gumms* of *Trees* (which wee see to be commonly shining and cleare) is but a fine Passage or *Straining* of the Iuice of the Tree, through the Wood and Bark. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent then *Gumms*) are the fine Exudations of *Stone*.

Aristotle giueth the Cause, vainely, why the *Feathers* of *Birdes* are of more liuely Colours, then the *Haires* of *Beastes*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. He saith, It is, because *Birds* are more in the Beames of the Sunn, then *Beasts*; But that is manifestly vntrue; For *Cattle* are more in the Sun then *Birds*, that liue commonly in the Woods, or in some Couert. The true Cause is, that the Excrementious Moisture of liuing Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer and more delicate Strainer, then it doth in *Beastes*: For *Feathers* passe through Quills; And *Haire* through Skin.

The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleauing Body is Mixed and Agitated with the *Liquours*; wherby the grosser Part of the *Liquor* sticks to that Cleauing Body; And so the finer Parts are freed from the Grosser. So the *Apothecaries* clarify their *Sirrupes* by whites of Eggs, beaten with the Iuices which they would clarify; which Whites of Eggs, gather all the Dreggs and grosser Parts of the Iuyce to them; And after the *Sirrupe* being sett on the Fire, the whites of Egges themselues harden, and are

are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about; And then passing it through a Wollen Bagge, which they call *Hippocrates Sleeve*: And the Cleauing Nature of the Milke draweth the Powder of the Spices, and Groſſer parts of the *Liquour* to it; And in the passage they stick vpon the Woollen Bagge.

The *Clarifying* of *Water*, is an *Experiment* tending to Health; besides the pleasure of the Bye, when *Water* is Crystalline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *Water* may straine through them.

It may be, *Percolation* doth not onely cause Clearenesse and Splendour, but Sweetnes of Sauour; For that also followeth, as well as Clearenes, when the Finer Parts are seuered from the Groſſer. So it is found, that the Sweates of Men that haue much Heat, and exercise much, and haue cleane Bodies, and fine Skins, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gumms* haue sweet Odours.

Take a *Glasſe*, and put *Water* into it, and wett your Finger, and draw it round about the Lipp of the Glasſe, preſſing it ſomewhat hard; And after you haue drawne it ſome few times about; it will make the *Water* friſke and ſprinckle vp, in a fine Dew. This *Instance* doth excellently Demonſtrate the Force of *Compreſſion* in a Solid Body. For whenſoeuer a Solid Body (as Wood, Stone, Mettall, &c.) is preſſed, ther is an inward Tumult in the parts therof; ſeeking to deliuer themſelues from the *Compreſſion*: And this is the Cause of all *Violent Motion*. Wherin it is ſtrange in the highest Degree, that this *Motion* hath neuer been obſerued, nor inquired; It being of all *Motions*, the moſt Common, and the Chiefe Roote of all *Mechanicall Operations*. This *Motion* worketh in round at firſt, by way of Prooſe, and Search, which way to deliuer it ſelfe; And then worketh in Progreſſe, wher it findeth the Deliuernance eaſieſt. In *Liquours* this *Motion* is viſible: For all *Liquours* ſtrucken make round Circles, and withall Daſh; but in *Solids*, (which breake not,) it is ſo ſubtile, as it is inuiſible; But neuertheleſs bewrayeth it ſelfe by many Effects; As in this *Instance* wherof we ſpeake. For the *Preſſure* of the Finger furthered by the wetting (becauſe it ſticketh ſo much the better vnto the Lipp of the *Glasſe*,) after ſome continuance, putteth all the ſmall Parts of the *Glasſe* into worke; that they ſtrike the *Water* ſharply; from which *Percuſſion* that Sprinkling commeth.

If you ſtrike or pierce a *Solid Body*, that is brittle, as *Glasſe*, or *Sugar*, it breaketh not onely, wher the immediate force is; but breaketh all about into ſhauers and fitters; The *Motion*, vpon the *Preſſure*, ſearching all wayes; and breaking wher it findeth the *Body* weakeſt.

The *Powder* in *Shot*, being Dilated into ſuch a *Flame*, as endureth not *Compreſſion*; Moueth likewiſe in round, (The *Flame* being in the Nature of a *liquid Body*;) Sometimes recoyling; Sometimes breaking the *Piece*;

B

But

Experiments
in Conſort
touching *Motion* of Bodies
vpon their
Preſſure.

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But generally discharging the *Bullets*, because ther it findeth easiest Deliverance.

12

This *Motion* vpon *Pressure*, and the Reciprocall therof, which is *Motion* vpon *Tensure*, we vse to call (by one common Name) *Motion of Libertie*, which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Dimension, deliuereth and restoreth it selfe to the *Naturall*: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Cloth* tentured spring backe. These two *Motions* (of which ther be infinite Instances,) we shall handle in due place.

13

This *Motion* vpon *Pressure* is excellently also demonstrated in *Sounds*; As when one Chimeth vpon a *Bell*, it foundeth; But as soon as he layeth his hand vpon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginall String*, as soone as the *Quill* of the *Iack* falleth vpon it, stoppeth. For these *Sounds* are produced, by the subtile Percussion of the Minute parts, of the *Bell*, or *String*, vpon the *Aire*; All one, as the *Water* is caused to leape by the subtile Percussion of the Minute parts of the *Glasfe*, vpon the *Water*, wherof we spake a little before in the 9th. *Experiment*. For you must not take it to be, the locall *Shaking* of the *Bell*, or *String*, that doth it. As we shall fully declare, when we come hereafter to handle *Sounds*.

Experiments
in Conseru-
ing Sepa-
rations of Bo-
dies by Weight

14

TAKE a *Glasfe* with a *Belly* and a long *Nebb*; fill the *Belly* (in part) with *Water*: Take also another *Glasfe*, whereinto put *Claret Wine* and *Water* mingled; Reverse the first *Glasfe*, with the *Belly* vpwards, Stopping the *Nebb* with your finger; Then dipp the Mouth of it within the Second *Glasfe*, and remoue your Finger: Continue it in that posture for a time; And it will vnminge the *VVine* from the *Water*: The *VVine* ascending and setling in the topp of the vpper *Glasfe*; And the *VVater* descending and setling in the bottome of the lower *Glasfe*. The passage is apparent to the Eye; For you shall see the *VVine*, as it were, in a small veine, rising through the *VVater*. For handsomnesse sake (because the Working requireth some small time) it were good you hang the vpper *Glasfe* vpon a Naile. But as soone as ther is gathered so much pure and vnmixed *water* in the Bottome of the Lower *Glasfe*, as that the Mouth of the vpper *Glasfe* dippeth into it, the *Motion* ceaseth.

15

Let the Vpper *Glasfe* be *VVine*, and the Lower *VVater*; ther followeth no *Motion* at all. Lett the Vpper *Glasfe* be *VVater* pure, the Lower *VVater* coloured; or contrariwise; ther followeth no *Motion* at all. But it hath been tried, that though the Mixture of *VVine* and *VVater*, in the Lower *Glasfe*, be three parts *VVater*, and but one *VVine*; yet it doth not dead the *Motion*. This Separation of *VVater* and *VVine* appeareth to be made by *Weight*; for it must be of *Bodies* of vnequall *Weight*, or ells it worketh not; And the Heauier *Body* must euer be in the vpper *Glasfe*. But then note withall, that the *VVater* being made pensile, and ther being a great *VVeight* of *VVater* in the *Belly* of the *Glasfe*, sustained by

by a small Pillar of *Water* in the Neck of the *Glasse* ; It is that, which setteth the *Motion* on worke : For *Water* and *Vine* in one *Glasse*, with long standing, will hardly seuer.

This *Experiment* would be Extended from Mixtures of seuerall *Liquors*, to *Simple Bodies*, which Consist of seuerall Similare Parts : Try it therfore with *Broyne* or *Salt water*, and *Fresh water* ; Placing the *Salt water* (which is the heauier) in the vpper *Glasse* ; And see whether the *Fresh* will come aboue. Try it also with *Water thick sugred*, and *Pure water* ; and see whether the *water* which commeth aboue, will loose his Sweetnes : For which purpose it were good ther were a little Cock made in the Belly of the vpper *Glasse*.

16

IN *Bodies* containing Fine Spiritts, which doe easely dissipate, when you make *Infusions*, the Rule is ; A short Stay of the *Body* in the *Liquor* receyuerh the Spiritt ; And a longer Stay confoundeth it ; because it draweth forth the Earthy Part withall ; which embaseth the finer. And therfore it is an Errour in *Physicians*, to rest simply vpon the Length of stay, for encreasing the vertue. But if you will haue the *Infusion* strong, in those kinde of *Bodies*, which haue fine Spiritts, your way is, not to giue Longer time, but to repeat the *Infusion* of the *Body* oftner. Take *Violetts*, and infuse a good Pugill of them in a Quart of Vineger ; Lett them stay three quarters of an houre, and take them forth ; And refresh the *Infusion* with like quantity of new *Violetts*, seuen times ; And it will make a Vineger so fresh of the *Flower*, as if a Twelue-moneth after, it be brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the *Flower*, a good while after, then at first.

Experiments
in Confort
touching *Indi-*
cations & *Accu-*
rate Infusions,
both in *Liquors*, and
Aire.

17

This Rule, which wee haue giuen, is of singular vse, for the Preparations of *Medecines*, and other *Infusions*. As for Example ; the Lease of *Burrage* hath an Excellent Spiritt, to repress the fuliginous Vapour of Dusky Melancholy, and so to cure Madnes : But neuerthelesse, if the Lease be infused long, it yieldeth forth but a raw substance, of no Vertue ; Therefore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it be Tunned, the *Burrage* stay a small time, and be often changed with fresh ; It will make a Soueraigne Drink for Melancholy Passions. And the like I conceyue of *Orenge Flowers*.

18

Rubarb hath manifestly in it Parts of contrary Operations : Parts that purge ; And parts that binde the body : And the first lay looser, and the latter lay deeper : So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and binde the Body lesse after the purging, then if it stood twenty foure houres ; This is tried : But I conceiue likewise, that by Repeating the *Infusion* of *Rubarb*, seuerall times, (as was said of *Violetts*,) letting each stay in but a small time ; you may make it as strong a *Purging Medecine*, as *Scammony*. And it is not a small thing wonn in *Physick*, if you can make *Rubarb*, and other *Mede-*

19

cines that are *Benedict*, as strong Purgers, as those that are not without some Malignity.

20

Purging Medecines, for the most part, haue their *Purgative* Vertue, in a fine Spirit; As appeareth by that they indure not boiling, without much losse of vertue. And therefore it is of good vse in *Physick*, if you can retaine the *Purging* Vertue, and take away the Vnpleasant tast of the *Purger*; which it is like you may doe, by this Course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Tast, is in the Groffer part.

21

Generally, the working by *Infusions*, is grosse and blinde, except you first try the Issuing of the seuerall Parts of the Body, which of them Issue more speedily, and which more slowly; And so by apportioning the time, can take and leaue that Quality, which you desire. This to know, ther be two waies; The one to try what long stay, and what short stay worketh, as hath been said: The other to try in Order, the succeeding *Infusions*, of one and the same Body, successiue, in seuerall *Liquors*. As for example; Take *Orange-Pills*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them *Infuse* halfe an houre in *Water*: Then takethem out, and *Infuse* them againe in other *Water*; And so the third time: And then tast and consider the *First water*, the *Second*, and the *Third*: And you will find them differing, not only in Strength and Weaknes, but otherwise in Tast, or Odour; For it may bee the *First water* will haue more of the Sent, as more Fragrant; And the *Second* more of the Tast, as more bitter or Biting, &c.

22

Infusions in *Aire*, (for so we may well call *Odours*) haue the same diuersities with *Infusions* in *Water*; In that the seuerall *Odours* (which are in one Flower, or other Body) issue at seuerall times; Some earlier, some latter: So we finde that *Violets*, *Woodbines*, *Strawberries*, yield a pleasing Sent, that commeth forth first; But soone after an ill Sent, quite differing from the Former; Which is caused, not so much by Mellowing, as by the late Issuing of the Groffer Spirit.

23

As we may desire to extract the finest Spirits in some Cases; So we may desire also to discharge them (as hurtfull) in some other. So *Vine burnt*, by reason of the Evaporating of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseeth some of his poisonous Quallity, if it be vapoured out, mingled with *Spirit of Wine*, or the like: *Sea* leeseeth somewhat of his windines by Decocting; And (generally) subtile or windy Spirits are taken off by Incension, or Evaporation. And euen in *Infusions* in things that are of too high a Spirit, you were better poure off the first *Infusion*, after a small time, and vse the latter.

Experiment
Solitary touching the
Appetite of Continuation in
Liquids.

24

Bubbles are in the forme of an *Hemisphere*; *Aire* within, and a little Skin of *Water* without: And it seemeth somewhat strange, that the *Aire* should rise so swiftly, while it is in the *Water*; And when it commeth to the topp, should be staid by so weake a Couer as that of the *Bubble* is. But as for the swift Ascent of the *Aire*, while it is vnder the

the

the *Water*, that is a *Motion* of *Percussion* from the *Water*; which it selfe descending, driueth vpp the *Aire*; and no *Motion* of *Leuity* in the *Aire*. And this *Democritus* called *Motus Plaga*. In this Common *Experiment*, the Cause of the Enclosure of the *Bubble* is, for that the Appetite to resist Separation, or Discontinuance, (which in solide *Bodies* is strong) is also in *Liquours*, though fainter and weaker; As wee see in this of the *Bubble*: we see it also in little Glasses of Spittle that children make of Rushes; And in Castles of Bubbles, which they make by blowing into *water*, hauing obtained a little Degree of Tenacity by Mixture of Soape: Wee see it also in the *Stillicides* of *water*, which if ther be *water* enough to follow, will Drawe themselves into a small thredd, because they will not discontinue; But if ther be no Remedy, then they cast themselves into round Dropps; which is the Figure, that saeth the Body most from Discontinuance: The same Reason is of the Roundnes of the *Bubble*, as well for the Skin of *water*, as for the *Aire* within: For the *Aire* likewise auoideth *Discontinuance*; And therefore casteth it self into a Round Figure. And for the stopp and Arrest of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no Appetite, of Ascending.

THE Reiection, which I continually vse, of *Experiments*, (though it appeareth not) is infinit; But yet if an *Experiment* be probable in the Worke, and of great Vse, I receyue it, but deliuer it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus: Finde out a hanging Ground, wher ther is a good quick Fall of Raine-water. Lay a Half-Trough of Stone, of a good length, 3. or 4. foote deep within the same Ground; with one end vpon the high Ground, the other vpon the lowe. Couer the Trough with Brakes a good thicknes, and cast Sand vpon the Topp of the Brakes: You shall see, (saith he) that after some showers are past, the lower End of the Trough will runn like a *Spring* of *water*: which is no maruaile, if it hold, while the Raine-water lasteth; But he said it would continue long time after the Raine is past: As if the water did multiply it self vpon the *Aire*, by the helpe of the Coldnesse and Condensation of the Earth, and the Confort of the first Water.

Experiment
Solitary touch-
ing the Ma-
king of *Artifi-
ciall Springs*.

25

THE *French*, (which put off the Name of the *French Disease*; vnto the Name of the *Disease* of *Naples*;) doe report, that at the Siege of *Naples*, ther were certaine wicked Merchants, that Barrelled vpp *Mans flesh*, (of some that had been, lately slaine in *Barbary*) and sold it for *Tunny*; And that vpon that foule and high Nourishment, was the Originall of that *Disease*. Which may well be; For that it is certaine, that the *Caniballs* in the *West Indies*, eate *Mans flesh*; And the *West Indies* were full of the Pockes when they were first discovered: And at this day the *Mortallest poisons*, practised by the *west Indians*, haue some Mixture of the Bloud, or Fatt, or *Flesh* of *Man*: And diuers Witches, and

Experiment
Solitary touch-
ing the *Vene-
mous Quality*
of *Mans Flesh*.

26

Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, have fedd vpon *Mans flesh*, to aid (as it seemeth) their Imagination, with High and foule Vapours.

Experiment
Solitary touch-
ing the *Verfi-*
on and *Trans-*
mutation of
Aire into
Water.

27

IT seemeth thatther be these waies (in likelihood) of *Version* of *Vapours*, or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly Condense; As wee see in the *Contracting* of the *Aire* in the *Weather-Glasse*; whereby it is a Degree nearer to *water*. Wee see it also in the *Generation* of *Springs*, which the *Ancients* thought (very probably) to be made by the *Version* of *Aire* into *water*, holpen by the *Rest*, which the *Aire* hath in those Parts; wherby it cannot dissipate. And by the *Coldnes* of *Rockes*; forther *Springs* are chiefly generated. Wee see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dews*, and *Raines*. And the Experiment of Turning *water* into *Ice*, by *Snow*, *Nitre*, and *Salt*, (wherof wee shall speake hereafter,) would be transferred to the Turning of *Aire* into *Water*. The Second way is by *Compression*; As in *Stillatories*, wher the Vapour is turned back, vpon it self, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* vpon the Couers of *Boyling Potts*; And in the *Dew* towards *Raine*, vpon *Marble*, and *wainscott*. But this is like to doe no great effect; Except it be vpon Vapours, and grosse *Aire*, that are already very neare in Degree to *Water*. The Third is that, which may be searched into, but doth not yet appeare; which is, by *Mingling* of moist Vapours with *Aire*; And trying if they will not bring a Returne of more *Water*, then the *water* was at first: For if so; That Increase is a *version* of the *Aire*: Therefore putt *water* into the Bottome of a *Stillatory*, with the *Nebb* stopped; Weigh the *water* first; Hang in the Middle of the *Stillatory* a large *Sponge*; And see what Quantitie of *water* you can crush out of it; And what it is more, or lesse, compared with the *water* spent; For you must vnderstand, that if any *Version* can be wrought, it will be easeliest done in small Pores: And that is the Reason why wee prescribe a *Sponge*. The Fourth way is Probable also, though not Appearing; Which is, by *Receiuing* the *Aire* into the small Pores of *Bodies*; For (as hath been said) euery thing in small Quantity is more easy for *version*; And Tangible Bodies haue no pleasure in the Consort of *Aire*, but endeavour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should Condense, ther is nothing to succeed: Therefore it must be in loose *Bodies*, as *sand*, and *Powder*; which wee see, if they lye close, of themselves gather Moisture.

Experiment
Solitary tou-
ching *Helpes*
towards the
Beauty and
good *Features*
of *Persons*.

28

IT is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put Young, into such a Cage, or Boxe, as they cannot rise to their Stature, but may encrease in Breadth, or length; will growe accordingly, as they can gett Roome: which if it be true, and faisible, and that the young *Creature* so pressed, and straightened,

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tened, doth nottherupon die; It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange Figure. This is certaine, and noted long since; That the Pressure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Macrocephali*; which shape of the Head, at that time, was esteemed. And the Raising gently of the Bridge of the Nose, doth prevent the Deformity of a Saddle Nose. Which observation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kindes, more comely, and better featured, then otherwise they would be; By the Forming and Shaping of them in their Infancy: As by Stroaking vp the Calues of the Leggs, to keepe them from falling downe too lowe; And by Stroaking vp the Forehead to keepe them from being low-foreheaded. And it is a common Practise to swath Infants, that they may growe more straight, and better shaped: And wee see Young Women, by wearing straight Bodies, keepe themselves from being Grosse, and Corpulent.

O *Nions*, as they hang, will many of them shoot forth; And so will *Penniroiall*; And so will an Herb called *Orpin*, with which they vse, in the Country, to trimme their Houses, binding it to a Lath, or Stick, and setting it against a wall. We see it likewise, more especially, in the greater *Semper-vine*, which will put out Branches, two or three yeares: But it is true, that commonly they wrapp the Root in a Cloth besmeared with *Oyle*, and renue it once in halfe a Yeare. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is; For that these *Plants* haue a Strong, Dense, and Succulent Moisture, which is not apt to exhale; And so is able, from the old store, without drawing helpe from the Earth, to suffice the sprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the Times of Putting forth. We see also, that *Stumps of Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Consequence, to try whether these things, in the Sprouting, doe increase *Weight*; which must be tried, by weighing them before they be hangd vp; And afterwards againe, when they are sprouted. For if they encrease not in *Weight*; Then it is no more but this; That what they send forth in the Sprout, they leese in some other Part: But if they gather *Weight*, then it is *Magnale Nature*; For it sheweth that *Aire* may be made so to be Condensed, as to be conuerted into a *Dense Body*; whereas the Race and Period of all things, here about the Earth, is to extenuate and turne things to be more *Pneumaticall*, and Rare; And not to be Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also, that *Aire* can *Nourish*; which is another great Matter of Consequence. Note, that to try this, the Experiment of the *Semper-vine* must be made without Oiling the Cloth; For els, it may be, the *Plant* receiueth Nourishment from the Oile.

Experiments
Solitary touch-
ing the Con-
densing of
Aire, in such
sort as it may
put on *Weight*,
and yield *Nourishment*.

Experiment
Solitary tou-
ching the Co-
mixture of
Flame and
Aire, and the
great Force
therof.

30

Flame and Aire doe not Mingle, except it be in an *Instant*; Or in the *Vitall Spirits* of *vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath been ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus far it is true: And then (forsooth) it is become another Element; the Forme wherof occupieth more place; And so, of Necessity, followeth a Dilatation: And therefore, lest two Bodies should be in one place, ther must needs also follow an Expulsion of the pellet; Or Blowing vp of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if ther were nothing els, except it were in very great quantity, will be suffocate with any hard Body, such as a Pellet is, Or the Barrell of a Gunn; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the Cause of this so potent a Motion, is the *Nitre*, (which wee call otherwise *Salt-Petre*;) which hauing in it a notable Crude and windy *Spirit*, first by the *Heate* of the *Fire* suddainly dilateth it self; (And wee knowe that simple *Aire*, being preternaturally attenuated by *Heate*, will make it self Roome, and brake and blowe vp that which resisteth it;) And Secondly, when the *Nitre* hath Dilated it self, it bloweth abroad the *Flame*, as an Inward Bellows. And therefore wee see that *Brimstone*, *Pitch*, *Camphire*, *Wilde-Fire*, and diuers other Inflammable Matters, though they burne cruelly, and are hard to quench; Yet they make no such fiery winde, as *Gunpowder* doth: And on the other side, wee see that *Quick Siluer*, (which is a most Crude and Watry Body) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certaine, their *Vitall Spirits* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a Body that hath some fixing, they will. For that you may best see in those two Bodies, (which are their *Aliments*;) *Water*, and *Oyle*; For they likewise will not well mingle of themselues, but in the Bodies of *Plants*, and *living Creatures*, they will. It is no maruaile therefore, that a small *Quantity* of *Spirits*, in the Cells of the Braine, and Canales of the Sinewes, are able to moue the whole Body, (which is of so great Masse,) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnes, As in playing Diuision vpon the *Lute*. Such is the force of these two Natures, *Aire* and *Flame*, when they incorporate.

Experiment
Solitary tou-
ching the Se-
cret Nature
of Flame.

31

TAKE a small *waxe Candle*, and putt it in a Socket, of *Brasse*, or *Iron*; Then sett it vpright in a *Porringer* full of *Spirit of Wine*, heated: Then sett both the *Candle*, and *Spirit of Wine*, on fire, and you shall see the *Flame* of the *Candle*, open it self, and become 4. or 5. times bigger then otherwise it would haue been; and appeare in Figure *Globular*, and not in *Piramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not waxe any whitt blew towards the Colour of the Outward flame of the *Spirit of Wine*. This is a Noble Instance;

Instance; wherein two things are most remarkable; The one; that one *Flame* within another quencheth not; but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnesse, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Rise. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but only remaineth contiguous; As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a Piramis in *Flame*, which we vsually see, is meerely by Accident, and that the *Aire* about, by quenching the *Sides* of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would be Round: And therefore *Smoake* is in the Figure of a Piramis Reuersed; For the *Aire* quencheth the *Flame*, and receiueh the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and moue vpwards, but moueth wauiing, and to and fro: As if *Flame* of his owne Nature (if it were not quenched,) would rowle and turne, as well as moue vpwards. By all which, it should seeme, that the Cælestiall Bodies, (most of them,) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and Determinate,; They haue Rotation; And they haue the Colour and Splendour of *Flame*: So that *Flame* aboue is Durable, and Consistent, and in his Naturall place; But with vs, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

Take an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it commeth forth, you shall finde those Parts of the *Arrow*, which were on the Outsides of the *Flame*, more burned, blacked, and turned almost into a Coale; whereas that in the Middest of the *Flame*, will be, as if the Fire had scarce touched it. This is an *Instance* of great consequence for the discouery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the *Sides*, than in the Middest: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked, and pent. And therefore the *Peripateticke*s (howsoever their opinion of an *Element* of *Fire* about the *Aire* is iustly exploded;) in that Point they acquit themselves well: For being opposed, that if there were a *Spheare* of *Fire*, that incompassed the Earth so neare hand, it were impossible but all things should be burnt vp; They answer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

It is affirmed constantly by many, as an vsuall Experiment; That a *Lampe* of *Vre*, in the Bottome of a Mine, will be tumbled, and stirred, by two Mens strength; which if you bring it to the Topp of the *Earth*, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tried to the full: For it is very probable, that the Motion

Experiment
Solitary touching the Different force of *Flame* in the Middest and on the *Sides*.

32

Experiment
Solitary touching the Decrease of the Naturall motion of Gravity in great distance from the *Earth*; or within some depth of the *Earth*.

33

of *Granitie* worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Vnion of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Mouing to a *Point* or Place (which was the Opinion of the *Ancients*) it is a meere Vanity.

Experiment
Solitary touching the
Contraction of Bodies
in Bulk, by the
Mixture of the more
Liquid Body with
the more Solid.

34

It is strange, how the *Ancients* tooke vp *Experiments* vpon credit, and yet did build great Matters vpon them. The Obseruation of some of the best of them, deliuered confidently is, That a *Vessel* filled with *Asbes*, will receiue the like quantity of *Water*, that it would haue done, if it had been empty. But this is vtterly vntrue; for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Asbes*; As we see that *Asbes* alone, if they be hard pressed, will lye in lesse roome: And so the *Asbes* with Aire betweene, lye looser; and with *Water*, closer. For I haue not yet found certainly, that the *Water*, it selfe, by mixture of *Asbes*, or *Dust*, will shrink or draw into lesse Roome.

Experiment
Solitary touching the
Making Vines more
fruitfull.

35

It is reported of credit, that if you lay good store of *Kernells* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier, and prosper better. It may be tried with other *Kernells*, laid about the *Root* of a *Plant* of the same kinde; As *Figgs*; *Kernells* of *Apples*, &c. The Cause may be, for that the *Kernells* draw out of the Earth Iuice fit to nourish the *Tree*, as those that would be *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robbeth and deuoureth the Nourishment, when they haue drawne it: As great *Fishes* deuoure little.

Experiments
in Consort
touching Purging
Medicines.

36

The Operation of *Purging Medicines*, and the Causes thereof, haue beene thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Qualitie*, and the like Shifts of Ignorance. The Causes of *Purging* are diuers; All plaine and perspicuous; And thoroughly maintained by Experience. The first is, That whatsoeuer cannot be overcome and digested by the *Stomacke*, is by the *Stomacke*, either put vp by *Vomit*, or put downe to the *Guts*; And by that *Motion* of *Expulsion* in the *Stomacke*, and *Guts*, other *Parts of the Body*, (as the *Orifices* of the *Veines*, and the like) are moued to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomacke*, is caused either by the *Qualitie* of the *Medicine*, or by the *Quantitie*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquintida*, &c. *Loathsome* and of horrible taste; As in *Agarick*, *Black Hellebore*, &c. And of *secret Malignity*, and disagreement towards *Mans Bodie*, many times not appearing much in the Taste; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine*, that

that *Purges*, and hath neither of the first two *Manifest Qualities*; it is to be held suspected, as a kinde of *Poyson*; For that it worketh either by *Corrosion*; or by a *secret Malignitie* and Enmitie to *Nature*: And therefore such *Medicines* are warily to be prepared, and vsed. The *Quantitie* of that which is taken, doth also cause *Purging*; As we see in a great *Quantitie* of *New Milke* from the Cow; yea and a great *Quantitie* of *Meat*; For *Surfets* many times turne to *Purges*, both vpwards, and downwards. Therefore we see generally, that the working of *Purging Medicines*, commeth two or three houres after the *Medicines* taken; For that the *Stomacke* first maketh a prooffe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantitie*.

A second *Cause* is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seene, that *Salt*, or any such thing that is sharpe and biting, put into the Fundament, doth prouoke the Part to expell; And *Mustard* prouoketh Sneezing: And any Sharpe Thing to the Eyes, prouoketh Teares. And therefore we see that almost all *Purgers* haue a kinde of *Twitching* and *vellication*, besides the *Gripping* which commeth of wind. And if this *Mordication* be in an ouer-high Degree, it is little better than the *Corrosion* of *Poyson*; And it commeth to passe sometimes in *Antimony*; Especially if it be giuen, to Bodies not repleat with Humors; For where Humors abound, the Humors saue the Parts.

The third *Cause* is *Attraction*: For I doe not deny, but that *Purging Medicines* haue in them a direct Force of *Attraction*; As *Drawing Plasters* haue in *Surgery*: And we see *Sage*, or *Betony* brused, *Sneezing-powder*, and other *Powders* or *Liquors* (which the *Physitians* call *Errhines*;) put into the Nose, draw Flegme, and water from the Head; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the Rheume downe by the Pallate. And by this Vertue, no doubt, some *Purgers* draw more one Humour, and some another, according to the Opinion receiued: As *Rubarb* draweth Choller; *Sean* Melancholy; *Agarick* Flegme; &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides Sympathy, between the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some Humour more than another. And it is, for that some *Medicines* work quicker than others: And they that draw quick, draw only the Lighter, & more fluide Humours; they that draw slow, worke vpon the more Tough, and Viscous Humours. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh only the Lightest part of the Humour away, and leaueth the Masse of Humours more obstinate. And the like may be said of *Worme-wood*, which is so much magnified.

The fourth *Cause* is *Flatuosity*; For *Wind* stirred moueth to expell: And we finde that (in effect) all *Purgers* haue in them a raw *Spirit*, or *Wind*; which is the Principall *Cause* of *Tortion* in the *Stomach*, and *Belly*. And therefore *Purgers* leese (most of them) the vertue, by *Decoction* vpon the Fire; And for that Cause are giuen chiefly in *Infusion*, *Iuyce*, or *Powder*.

40

The fifth Cause is *Compression*, or *Crushing* : As when *Water* is Crushed out of a *Sponge* : So we see that *Taking Cold* moueth Loosenesse by Contraction of the Skinn, and outward Parts; And so doth *Cold* likewise cause Rheumes, and Defluxions from the Head; And some *Astringent Plasters* crush out purulent Matter. This kind of Operation is not found in many *Medicines* : *Mirabolanes* haue it; And it may be the *Barkes of Peaches*; For this Vertue requireth an *Astriction*; but such an *Astriction*, as is not gratefull to the Body; (For a pleasing *Astriction* doth rather Binde in the Humours, than Expell them :) And therefore such *Astriction* is found in Things of an *Harrish Taste*.

41

The Sixth Cause is *Lubrefaction*, and *Relaxation*. As we see in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallows*, *Lettuce*, *Mercuriall*, *Pelletory of the Wall*, and others. There is also a secret Vertue of *Relaxation* in *Cold*: For the *Heat* of the Body bindeth the Parts and Humours together, which *Cold* relaxeth: As it is seene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, breake, and dissolue. And by this kinde of *Relaxation*, *Feare* looseth the Belly; because the Heat retiring inwards towards the Heart, the Gutts and other Parts are relaxed; In the same manner, as *Feare* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42

The Seuenth Cause is *Abstersion*; which is plainly a *Scouring off*, or *Incision* of the more viscid Humors, and making the Humors more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (speedily) from the Foulness. But this *Incision* must be by a *Sharpnesse*, without *Astriction*: Which wee finde in *Salt*, *Worm-wood*, *Oxymel*, and the like.

43

There be *Medicines*, that moue *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stool* are such as enter not at all, or little into the *Mesentery Veines*; But either at the first are not digestible by the *Stomach*, and therefore moue immediatly downwards to the *Gutts*; Or else are afterwards reiected by the *Mesentery Veines*, and so turne likewise downwards to the *Gutts*; and of these two kinds are most *Purgers*. But those that moue *Vrine*, are such, as are well digested of the *Stomach*, and well receiued also of the *Mesentery Veines*; So they come as farre as the *Liver*, which sendeth *Vrine* to the *Bladder*, as the *Whey of Bloud*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liver*, in sending downe the wheyey Part of the *Bloud* to the *Reines*. For *Medicines Vrinative* doe not worke by Reiection, and Indigestion, as *Solutiue* doe.

44

There be diuers *Medicines*, which in greater *Quantity*, moue *Stool*, and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantity*, moue *Vrine*, and in smaller, *Stool*. Of the former sort is *Rubarb*, and some others. The Cause is, for that *Rubarb* is a *Medicine*, which the *Stomach* in a small *Quantity* doth digest, and overcome, (being not Flatulous, nor Loathsome;) and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater *Quantitie*, the

the *Stomach* cannot overcome it, and so it goeth to the *Gutts*. *Pepper* by some of the *Ancients* is noted to be of the second sort; which being in small *Quantity*, moueth wind in the *Stomach* and *Gutts*, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *Wind*; And it selfe getteth to the *Mesentery veines*; And so to the *Liver*, and *Reines*; where, by Heating and Opening, it sendeth downe *Urine* more plentifully.

Wee haue spoken of *Evacuating* of the *Body*; wee will now speake something of the *Filling* of it by *Restoratives* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one Part that is more Nourishing than another; As *Graines*, and *Roots* nourish more, than the *Leaves*; In so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding *Leaves* vnable to Nourish Mans *Body*. Whether there be that difference in the *Flesh* of *Living Creatures*, is not well inquired: As whether *Liners*, and other *Entrails*, be not more Nourishing, than the *Outward Flesh*. Wee find that amongst the *Romans*, a *Gooses Liner* was a great Delicacy; In so much as they had Artificiall Meanes to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceiue that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would bee a very *Nourishing Broth*: Wee finde also that *Scotch Skinck*, (which is a Pottage of strong Nourishment,) is made with the *Knees*, and *Sinewes* of *Beefe*, but long boiled: *Jelly* also, which they vse for a Restorative, is chiefly made of *Knuckles of Veale*. The *Pulp* that is within the *Crawfish* or *Crabb*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crabb* or *Crawfish*. The *Yolkes* of *Egges* are clearely more Nourishing than the *Whites*. So that it should seeme, that the Parts of *Living Creatures*, that lye more Inwards, nourish more than the *Outward Flesh*: Except it bee the *Braine*; which the *Spirits* prey too much vpon, to leaue it any great Vertue of Nourishing. It seemeth for the Nourishing of *Aged Men*, or *Men in Consumptions*, some such thing should be Devised, as should be halfe *Chylus*, before it be put into the *Stomach*.

Take two large *Capons*; perboile them vpon a soft fire, by the space of an houre, or more, till in effect all the *Bloud* be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shanckes*, and throw them away. Then with a good strong Chopping-knife, mince the two *Capons*, bones and all, as small as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, sweet, and well seasoned, of foure gallons of Beere, of 8. *℔*. strength, new as it commeth from the Tunning; Make in the Kilderkin a great Bung-hole of purpose: Then thrust into it, the Boulter (in which the *Capons* are) drawne out in length; Let it steepe in it three Dayes, and three Nights, the Bung-hole open, to worke; Then close the Bung-hole, and so let it continue, a Day and a halfe; Then draw

Experiments
in Confort
touching Meats
and Drinks that
are most Nourishing.

45

46

draw it into bottles, and you may drinke it well after three dayes Bot-
teling; And it will last six weeks (approued.) It drinketh fresh, flow-
reth and mantleth exceedingly; It drinketh not newish at all; It is an
excellent Drinke for a Consumption, to be drunke either alone, or Car-
ded with some other Beere. It quencherh Thirst, and hath no whit of
windinesse. Note, that it is not possible, that Meat and Bread, either in
Broths, or taken with Drink, as is vsed, should get forth into the veines,
and outward Parts, so finely, and easily, as when it is thus Incorporate,
and made almost a *Chylus* aforehand.

47

Triall would bee made of the like Brew with *Potato Roots*, or *Burr
Roots*, or the *Pith* of *Artichoakes*, which are nourishing Meats: It may
be tried also, with other flesh; As *Pheasant*, *Partridge*, *Young Porke*, *Piege*,
Venison, especially of *young Deere*, &c.

48

A *Mortresse* made with the *Browne* of *Capons*, stamped, and strained,
and mingled (after it is made) with like quantitie, (at the least,) of
Almond Butter; is an excellent Meat to Nourish those that are weake;
Better than *Blanck-Manger*, or *Jelly*: And so is the *Cullice* of *Cocks*, boyled
thick with the like Mixture of *Almond Butter*: For the *Mortresse*, or *Cul-
lice*, of it selfe, is more Sauoury and strong; And not so fit for Nouri-
shing of weake Bodies; But the *Almonds* that are not of so high a taste
as *Flesh*, doe excellently qualifie it.

49

Indian Mai hath (of certaine) an excellent Spirit of Nourish-
ment; But it must be thoroughly boyled, and made into a *Mai-Cream*
like a *Barley Cream*. I iudge the same of *Rize*, made into a *Cream*;
For *Rize* is in *Turky*, and other Countries of the East, most fed vpon;
But it must be thoroughly boyled in respect of the Hardnesse of it: And
also because otherwise it bindeth the Body too much.

50

Pistachoes, so they be good, and not musty, ioyned with *Almonds* in *Al-
mond Milke*; Or made into a *Milke* of themselves, like vnto *Almond
Milke*, but more greene, are an excellent Nourisher. But you shall doe
well, to adde a little *Ginger*, scraped, because they are not without some
subtill windinesse.

51

Milke warme from the Cow, is found to be a great Nourisher, and a
good Remedy in *Consumptions*: But then you must put into it, when
you milke the Cow, two little bagges; the one of *Powder* of *Mint*, the
other of *Powder* of *Red Roses*; For they keepe the *Milke* somewhat from
Turning, or Crudling in the stomach; And put in Sugar also, for the
same cause, and partly for the Taste sake; But you must drinke a good
draught that it may stay lesse time in the stomach, lest it Cruddle: And
let the Cup into which you milke the Cow, bee set in a greater Cup
of hot water, that you may take it warme. And *Cow-milke* thus prepared,
I iudge to be better for a *Consumption*, than *Asse-milke*, which (it is true)
turneth not so easily, but it is a little harrish; Marry it is more proper
for Sharpnesse of *Vrine*, and Exulceration of the Bladder, and all man-
ner of Lenifyings. *Womans milke* likewise is prescribed, when all faile;
but I commend it not; as being a little too neere the Iuyce of Mans Bo-
dy,

dy, to be a good Nourisher; Except it be in *Infants*, to whom it is Naturall.

Oyle of Sweet Almonds, newly drawen, with *Sugar*, and a little *Spice*, spread vpon Bread toasted, is an Excellent Nourisher; But then to keepe the *Oyle* from frying in the Stomach, you must drinke a good draught of *Milde Beere* after it; And to keepe it from relaxing the Stomach too much, you must put in a little Powder of *Cinnamon*.

52

The *Tolkes* of *Eggs* are of themselves so well prepared by Nature for Nourishment; As (so they be Potched, or Reare boiled) they need no other Preparation, or Mixture; yet they may be taken also rawe, when they are new laid, with *Malmesey*, or *Sweet wine*; You shall doe well to put in some few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, besides the immediate Facultie of Nourishment, such Drinke will strengthen the Backe; So that it will not draw downe the *Vrine* too fast; For too much *Vrine* doth alwaies hinder Nourishment.

53

Mincing of meat, as in *Pies*, and *battered Minced Meat*, faueth the Grinding of the Teeth; And therefore, (no doubt) it is more Nourishing; Especially in Age; Or to them that haue weake Teeth; But the Butter is not so proper for weake Bodies; And therefore it were good to moisten it with a little *Claret wine*, Pill of *Limon*, or *Orange*, cut small, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuetts*, which are likewise minced Meat, in stead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistachomilke*; or *Barly*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reserue to the due place.

54

We haue hitherto handled the Particulars which yeeld best, and easiest, and plentifullest Nourishment; And now we will speake of the best Meanes of Conueying, and Conuerting the Nourishment.

The First *Meanes* is, to procure that the *Nourishment* may not be robbed, and drawen away; wherein that, which we haue already said, is very Materiall; To prouide, that the *Reines* draw not too strongly an ouer-great Part of the *Bloud* into *Vrine*. To this adde that Precept of *Aristotle*, that *Wine* be forborne in all *Consumptions*; For that the *Spirits* of the *Wine*, doe prey vpon the Roscide Iuyce of the Body, and inter-common with the *Spirits* of the Body, and so deceiue and robbe them of their Nourishment. And therefore if the *Consumption* growing from the weaknes of the Stomach, doe force you to vse *Wine*, let it alwaies be burnt, that the Quicker *Spirits* may euaporate; or at the least quenched with two little wedges of Gold, six or seuen times repeated. Adde also this Prouision, That there be not too much *Expence* of the *Nourishment*, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to sweat, it must be gently restrained. But chiefly *Hippocrates* Rule is to bee followed; who aduiseeth quite contrary to that which is in vse: Namely, that the *Linnen*, or *Garment* next the Flesh, be in Winter drie, and oft changed;

55

changed; And in Sommer seldome changed, and smeared ouer with Oyle; For certaine it is, that any Substance that is fat, doth a little fill the Pores of the Body, and stay Sweat, in some Degree. But the more cleanly way is, to haue the *Linnen* smeared lightly ouer, with Oyle of *Sweet Almonds*; And not to forbear shifting as oft as is fit.

56

The Second *Meanes* is, to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must be by *Strengthening* of the *Stomach*; And in this, because the *Stomach* is chiefly comforted by *Wine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the *Stomach*: Wherin it hath beene tried, that the *Quilt* of *Roses*, *Spices*, *Mastick*, *Wormewood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Ale-gant*; And to drie it; And after it be dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the *Stomach*: For it is certaine, that all Flower hath a potent Vertue of *Astriction*; In so much as it hardeneth a peece of flesh, or a Flower, that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lye long.

57

The Third *Meanes* (which may be a Branch of the former) is to send forth the *Nourishment* the better by *Sleepe*. For we see, that Beares, and other *Creatures* that *sleepe* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleued) that *Sleepe* doth Nourish much; Both for that the Spirits do lesse spend the Nourishment in *Sleepe*, then when liuing *Creatures* are awake: And because (that which is to the present purpose) it helpeth to thrust out the Nourishment into the *Parts*. Therefore in Aged men, and weake Bodies, and such as abound not with Choller, a short *Sleepe* after dinner doth helpe to Nourish; For in such Bodies there is no feare of an ouer-hastie Digestion, which is the Inconuenience of Postmeridian *Sleepes*. *Sleepe* also in the Morning, after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further Nourishment: But this would bee done, sitting vpright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the *Stomach*.

58

The Fourth *Meanes* is to prouide that the *Parts* themselues may draw to them the Nourishment strongly. There is an Excellent Obseruation of *Aristotle*; That a great Reason, why Plants (some of them) are of greater Age, than *Liuing Creatures*, is, for that they yearely put forth new Leaues, and Boughes; whereas *Liuing Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nailles; which are Excrements, and no *Parts*. And it is most certaine, that what-soeuer is young, doth draw Nourishment better, than that which is Old; And then (that which is the Mystery of that Obseruation) young *Boughes*, and *Leaues*, calling the Sap vp to them; the same Nourisheth the *Body*, in the Passage. And this we see notably proued also, in that the oft Cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transferrre therefore this Obseruation to the

Helping

Helping of Nourishment in *Living Creatures*: The Noblest and Principall Use whereof is, for the *Prolongation of Life*; *Restauration* of some Degree of *Youth*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Living Creatures* Parts that Nourish, and Repaire easily; And Parts that Nourish and repaire hardly, And you must refresh, and renew those that are easie to Nourish; that the other may be refreshed, and (as it were) Drinke in Nourishment, in the Passage. Now wee see that *Draught Oxen*, put into good Pasture, recover the Flesh of young Beefe; And Men after long Emaciating Diets, wax plumpe, and fat, and almost New: So that you may surely conclude, that the frequent and wise Use of those *Emaciating Diets*, and of *Purgings*; And perhaps of some kinde of *Bleeding*; is a principall Meanes of *Prolongation of Life*; and *Restoring* some Degree of *Youth*: For as we haue often said, *Death* commeth vpon *Living Creatures* like the Torment of *Mezentius*;

Mortua quinetiam iungebat Corpora uinis,

Componens Manibusq; Manus, atq; Oribus Ora.

For the Parts in Mans Body easily reparable, (as *Spirits, Bloud, and Flesh*;) die in the Embrace of the Parts hardly reparable, (as *Bones, Nerves, and Membranes*;) And likewise some *Entrails* (which they reckon amongst the *Spermatick Parts*) are hard to repaire: Though that Diuision of *Spermatick*, and *Menstruall Parts*, be but a Conceit. And this same *Observation* also may be drawne to the present purpose of Nourishing Emaciated Bodies: And therefore *Gentle Friction* draweth forth the Nourishment, by making the Parts a little hungry, and heating them; whereby they call forth Nourishment the better. This *Friction* I wish to be done in the Morning. It is also best done by the *Hand*, or a peece of *Scarlet wooll*, wet a little with *Oile of Almonds*, mingled with a small Quantity of *Bay-salt*, or *Saffron*. We see that the very Currying of Horses doth make them fat, and in good liking.

The Fifth Meanes is, to further the very *Act of Assimilation* of Nourishment; which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I haue compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The use of it would be betweene Sleepes; For in the latter Sleep the Parts *Assimilate* chiefly.

There be many *Medicines*, which by themselves would doe no Cure, but perhaps Hurt; but being applyed in a certaine Order, one after another, doe great Cures. I haue tried (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driuen it away in 24. Houres space: It is first to apply a *Pulasse*; Of which *vide* the *Receit*; And then a *Bath* or *Fomentation*, of which *vide* the *Receit*; And then a *Plaster*, *vide* the *Receit*. The *Pulasse* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pulasse*, Draweth gently; And therefore draweth the Humour out; and doth not draw more to it; For it

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is

59

Experiment
Solitary touching *Filum*
Medicinale.

60

is a *Gentle Fomentation*, and hath withall a Mixture, (though very little) of some *Stupefactine*. The *Plaster* is a Moderate *Astringent Plaster*, which repelleth New Humour from falling. The *Pulasse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pulasse*, would draw forth little; If too strong, it would draw to the Part, as well as draw from it. The *Plaster* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pulasse* is to be laid to for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being vsed hot, and seuen or eight times repeated: The *Plaster* to continue on still, till the Part be well confirmed.

Experiment
Solitary tou-
ching Cure by
Custome.

61

There is a secret Way of Cure, (vnpractized;) By *Assuetude* of that which in it selfe hurteth. *Poysons* haue beene made, by some, Familiar, as hath beene said. *Ordinary keepers* of the *Sicke* of the *Plague*, are sel-dome infected. *Enduring of Torture*, by *Custome*, hath been made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *Wine* or *Strong Drinke*, hath beene, by *Custome*, made to be without *Surfet*, or *Drunkennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kindes of *Palsyes*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the Iust Cure of it be not full of perill; And if he finde it to bee such, let him resort to *Palliation*; And alleuiate the *Symptome*, without busying himselfe too much with the perfect Cure: And many times, (if the *Patient* be indeed patient,) that Course will exceed all Expectation. Likewise the *Patient* himselfe may striue, by little and little, to Ouercome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment
Solitary tou-
ching Cure by
Excesse.

62

Diuers *Diseases*, especially *Chronicall*, (such as *Quartan Agues*;) are sometimes cured by *Surfet*, and *Excesses*; As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, & the like. The Cause is, for that *Diseases* of *Cōtinuance* get an *Adēntitious* Strength frō *Custome*, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leaue them only to their first Cause; which if it be any thing weake will fall off. Besides, such *Excesses* doe Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment
Solitary tou-
ching Cure by
Motion of Con-
sent.

63

There is in the Body of Man a great *Consent* in the *Motion* of the seuerall Parts. We see, it is Childrens sport, to proue whether they can rub vpon their Brest with one hand, and pat vpon their Fore-head with another; And straight-waies, they shall sometimes rubbe with both Hands, or pat with both hands. We see, that when the Spirits, that come to the Nostrills, expell a bad Sent, the Stomach is ready to Expell

pell by Vomit. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they dye. So in *Pestilent Diseases*, if they cannot be expelled by *Sweat*, they fall likewise into *Loosenesse*, and that is commonly Mortall. Therefore *Physitians* should ingeniously contriue, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Hippocrates Aphorisme, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sexe*, *Season of the yeare*, *Diet*, &c. are more dangerous, than those that are Concurrent. A Man would thinke it should be otherwise; For that, when the *Accident of Sicknesse*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should be more forcible: And so (no doubt) it is; if you suppose like *Quantity* of *Matter*. But that, which maketh good the *Aphorisme*, is; Because such *Diseases* doe shew a greater *Collection of Matter*, by that they are able to overcome those *Naturall Inclinations* to the Contrary. And therefore in *Diseases* of that kinde, let the *Physitian* apply himselfe more to *Purgation*, than to *Alteration*; Because the Offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Physitians do wisely prescribe, that there be *Preparatives* vsed before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body be not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the *Humours*, and their not comming faire away; Which causeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently. Therefore the worke of *Preparation* is double; To make the *Humours* fluide, and mature; And to make the *Passages* more open: For both those helpe to make the *Humours* passe readily. And for the former of these, *Sirrups* are most profitable; And for the Latter, *Apozymes*, or *Preparing Braaths*; *Clisters* also helpe, lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies abounding with Humours*; And *fat Bodies*; And *Open weather*; are *Preparatives* in themselves; because they make the *Humours* more fluide. But let a *Physitian* beware, how he purge after hard *Frostie Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the *Lodging* of some *Humours* in ill Places: For it is certaine, that there be *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places, (especially *Passages*), doe much mischief. Therefore it is good, after *Purging*, to vs. *Apozymes*, and *Broths*, not so much *Opening* as those vsed before *Purging*, but *Abstersiue* and

Experiment
Solitary touching cure of
Diseases which
are contrary to
Predispotion.

64

Experiment
Solitary touching Preparations before
Purging, and
settling of the
Body afterward.

65

Modifying Clusters also are good to conclude with, to draw away the Reliques of the Humours, that may have descended to the *Lower Region of the Body*.

Experiment
Solitary touch-
ing & touching
of Blood.

66

Blood is stanch'd diuers waies. First by *Astringents*, and *Repercu-
sive Medicines*. Secondly by *Drawing* of the *Spirits* and *Bloud inwards*;
which is done by *Cold*; As *Iron*, or a *Stone* laid to the neck doth stanch
the Bleeding at the Nose; Also it hath beene tryed, that the *Testicles*,
being put into sharp Vineger, hath made a suddaine Recess of the Spi-
rits, and stanch'd Bloud. Thirdly by the *Recess of the Bloud* by
Sympathy. So it hath beene tried, that the part that bleedeth, be-
ing thrust into the Body of a Capon, or Sheepe, new ript and bleed-
ing, hath stanch'd *Bloud*; The *Bloud*, as it seemeth, sucking and drawing
vp, by similitude of substance, the *Bloud* it meeteth with, and so it selfe
going backe. Fourthly by *Custom* and *Time*; So the Prince of *Au-
range*, in his first hurt, by the *Spanish Boy*, could finde no meanes to stanch
the *Bloud*, either by *Medicine* or *Ligament*; but was faine to haue the *Ori-
fice* of the *Wound* stopped by *Mens Thumbs*, succeeding one another,
for the space at least of two Dayes; And at the last the bloud by *Cu-
stome* onely retired. There is a fifth Way also in vse, to let *Bloud* in an
Adverse Part, for a *Reuulsion*.

Experiment So-
litary touching
Change of Al-
iments and Me-
dicines.

67

It helpeth, both in *Medicine*, and *Aliment*, to Change and not to
continue the same *Medicine* & *Aliment* still. The Cause is, for that *Nature*
by continuall Vse of any Thing, groweth to a *Sacietie*, and *Dulnesse*, ei-
ther of *Appetite*, or *Working*. And we see that *Assuetude* of *Things Hurt-
full* doth make them leese their force to Hurt; As *Poyson*, which with
vse some haue brought themselves to brooke. And therefore it is no
maruaile, though *Things helpfull*, by *Custom*, leese their force to Helpe. I
count *Intermission* almost the same thing with *Change*; For that, that
hath beene intermitted, is after a sort new.

Experiment
Solitary tou-
ching Diets.

68

It is found by Experience, that in *Diets of Guaiacum*, *Sarxa*, and the
like (especially if they be strict,) the *Patient* is more troubled in the be-
ginning, then after continuance; Which hath made some of the more
delicate Sort of patients, giue them ouer in the midst; Supposing
that if those Diets trouble them so much at first, they shall not be able
to endure them to the End. But the Cause is, for that all those *Diets*, doe
drie vp *Humours*, *Rheumes*, and the like; And they cannot Drie vp vntil
they haue first attenuated; And while the *Humour* is attenuated, it is
more Fluid, then it was before, and troubleth the Body a great deale
more, vntill it be dried vp, and consumed. And therefore *Patients* must
expect a due time, and not checke at them at the first.

Experiments
in Consort
touching the
Production of
Cold.

The *Producing of Cold* is a thing very worthy the Inqui-
sition; both for Vse, and Disclosure of Causes. For *Heat* and
Cold

Cold are *Natures* two Hands, whereby she chiefly worketh : And *Heat* we haue in readinesse, in respect of the *Fire* ; But for *Cold* we must staie till it commeth ; or seecke it in deepe *Caves*, or high *Mountaines* : And when all is done, we cannot obtaine it in any great degree : For *Furnaces* of *Fire* are farre hotter, then a *Sommers Sunne* ; But *Vaults*, or *Hills* are not much *Colder* then a *Winters Frost*.

The first *Meanes* of *Producing Cold*, is that which *Nature* presenteth vs withall ; Namely the *Expiring* of *Cold* out of the *Inward Parts* of the *Earth* in *Winter*, when the *Sun* hath no power to ouercome it ; the *Earth* being (as hath beene noted by some) *Primum Frigidum*. This hath beene asserted, as well by *Auncient* as by *Moderne Philosophers* : It was the *Tenet* of *Parmenides*. It was the opinion of the *Authour* of the discourse in *Plutarch* (for I take it that booke was not *Plutarches* owne) *De primo Frigido*. It was the opinion of *Teleseus*, who hath renewed the *Philosophy* of *Parmenides*, and is the best of the *Nonellists*.

The Second *Cause* of *Cold* is the *Contact* of *Cold Bodies* ; For *Cold* is *Active* and *Transitive* into *Bodies* *Adiacent*, as well as *Heat* : which is seene in those things that are touched with *Snow* or *Cold water*. And therefore, whosoever will be an *Inquirer* into *Nature*, let him resort to a *Conservatory* of *Snow* and *Ice* ; Such as they use for delicacy, to coole *Wine* in *Summer* : Which is a *Poore* and *Contemptible* use, in respect of other uses, that may bee made of such *Conservatories*.

The Third *Cause* is the *Primary Nature* of all *Tangible bodies* : For it is well to be noted, that all Things whatsoever (*Tangible*) are of themselves *Cold* ; Except they haue an *Accessory Heat* by *fire* ; *Life* ; or *Motion* : For euen the *Spirit* of *Wine*, or *Chymicall Oyles*, which are so hot in *Operation*, are to the first Touch *Cold* ; And *Aire* it selfe compressed, and *Condensed* a little by blowing, is *Cold*.

The Fourth *Cause* is the *Density* of the *Body* ; For all *Dense Bodies* are *Colder* then most other *Bodies* ; As *Mettalls*, *Stone*, *Glasse* ; And they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Dense*, *Tangible*, hold all of the *Nature* of *Cold*. The *Cause* is, for that all *Matters Tangible* being *Cold*, it must needs follow, that where the *Matter* is most *Congregate*, the *Cold* is the greater.

The Fifth *Cause* of *Cold*, or rather of increase and vehemence of *Cold*, is a *Quicke Spirit* inclosed in a *Cold Body* : As will appeare to any that shall attentively consider of *Nature* in many *Instances*. Wee see *Nitre* (which hath a *Quicke Spirit*) is *Cold* ; more *Cold* to the *Tongue*, then a *Stone* ; So *Water* is *Colder* then *Oile*, because it hath a *Quicker Spirit* ; For all *Oile*, though it hath the *Tangible Parts* better digested then *Water*, yet hath it a duller *Spirit* : So *Snow* is *Colder* then *Water*, because it hath more *Spirit* within it : So we see that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaseth the *Actiuitie* of *Cold* : So some *Insecta* which haue

Spiris

Spirit of Life, as *Snakes*, and *Silkwormes*, are, to the touch, *Cold*. So *Quick-silver* is the *Coldest* of *Mettals*, because it is *fullest of Spirit*.

74

The *Sixth Cause of Cold* is the *Chasing and Driving away of Spirits*, such as haue some *Degree of Heat*: For the *Banishing of the Heat* must needs leaue any *Body Cold*. This we see in the *Operation of Opium*, and *Stupefactiues*, vpon the *Spirits of liuing Creatures*: And it were not amisse to trie *Opium*, by laying it vpon the *Top of a Weather-glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a *Body as Glasse*, I conceiue that *Opium*, and the like, make the *Spirits* fly rather by *Malignity*, then by *Cold*.

75

Seuenthly, the same *Effect* must follow vpon the *Exhaling or Drawing out of the warme Spirits*, that doth vpon the *Flight of the Spirits*. There is an *Opinion*, that the *Moone* is *Magneticall of Heat*, as the *Sun* is of *Cold*, and *Moisture*: It were not amisse therefore to trie it, with *Warme waters*; The one exposed to the *Beames of the Moone*; the other with some *Skreene* betwixt the *Beames of the Moone* and the *water*; As we vie to the *Sunne* for *Shade*; And to see whether the former will coole sooner. And it were also good to inquire, what other *Meanes* there may be, to draw forth the *Exile heat*, which is in the *Aire*; for that may be a *Secret of great Power* to *Produce Cold weather*.

Experiments
in Consort tou-
ching the Ver-
sion and Trans-
mutation of Aire
into water.

We haue formerly set downe the *Meanes of turning Aire into water*, in the *Experiment 27*. But because it is *Magnale Nature*; And tendeth to the subduing of a very great effect; And is also of *Manifold vse*; we will adde some *Instances in Consort* that giue light thereunto.

76

It is reported by some of the *Ancients*, that *Sailers* haue vsed, every *Night*, to hang *Fleeces of wooll* on the sides of their *Ships*, the *Wooll* towards the *water*; And that they haue crushed fresh *Water* out of them, in the *Morning*, for their vse. And thus much we haue tried, that a *Quantitie of Wooll* tied loose together, being let downe into a deepe *Well*; And hanging in the *Middle*, some three *Fathome* from the *water*, for a *night*, in the *Winter time*; increased in weight, (as I now remember) to a fifth *Part*.

77

It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certaine *Werke-men*, in time of *Warres*, fled into *Cauers*; And the *Mouth of the Cauers* being stopped by the *Enemies*, they were famished. But long time after the dead *Bones* were found; And some *Vessels* which they had carried with them; And the vessels full of *Water*; And that *Water*, thicker, and more towards *Ice*, than *Common Water*: which is a *Notable Instance of Condensation*, and *Induration*, by *Buriall vnder Earth*, (in *Cauers*;) for long time; And of *version* also (as it should seeme,) of *Aire* into *Water*; if any of those vessels were *Emptie*. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like

like in *Quick-silver*: And if you finde the *Bladders* fallen, or shrunk; you may be sure the *Aire* is condensed by the *Cold* of those *Bodies*. As it would be in a *Cave* vnder *Earth*.

It is reported of very good credit, that in the *East Indies*, if you set a Tub of *water* open, in a Roome where *Clones* are kept, it will be drawne dry in 24. houres; Though it stand at some distance from the *Clones*. In the Countrey, they vse many times, in deceit, when their *wooll* is new shorne, to set some Pailles of *water* by, in the same Roome; to increase the weight of the *wooll*: But it may be, that the Heat of the *wooll*, remaining from the body of the *Sheepe*; or the Heat gathered by the lying close of the *wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*.

It is Reported also credibly, that *wooll* new shorne, being laid casually vpon a *Vessell* of *Veriuyce*, after some time, had drunke vp a great part of the *Veriuyce*, though the *Vessell* were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (vpon the by) to be noted, the *Percolation*, or *Suing* of the *Veriuyce* through the wood; For *Veriuyce* of it selfe would neuer haue passed thorow the wood: So as, it seemeth, it must be first in a kinde of Vapour, before it passe.

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* haue an Antipathy with *Aire*; And if they finde any *Liquid Body*, that is more dense, neare them, they will draw it: And after they haue drawne it, they will condense it more, and in effect incorporate it; For wee see that a *Sponge*, or *wooll*, or *Sugar*, or a *woollen cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquour* higher, and beyond the place, where the *water* or *wine* commeth. We see also, that *Wood*, *Lute-strings*, and the like, doe swell in moist Seasons: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth* of *Boxes*, and *Opening* of *Wainscot doores*; which is a kinde of *Infusion*: And is much like to an *Infusion* in water, which will make wood to swell: As we see in the *Filling* of the *Chops* of *Boules*, by laying them in water. But for that part of these *Experiments*, which concerneth *Attraction*; we will reserue it to the proper Title of *Attraction*.

There is also a *Version* of *Aire* into *water*, scene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the Body yeeldeth; Or else by the Moist *Aire* thickned against the hard body. But it is plaine, that it is the latter; For that we see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the Smoothnesse and Closenesse; which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. We see also, that *Breathing* vpon a *Glasse*, or Smooth body, giueth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew vpon the

78

79

80

81

the Inside of Glasse-windowes; And the *Frost* it selfe vpon the ground is but a *Perfion* or *Condensation*, of the Moist vapours of the Night, into a watry substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*.

It is very probable (as hath beene touched) that that, which will turne *Water* into *Ice*, will likewise turne *Aire* Some Degree nearer vnto *water*. Therefore trie the *Experiment* of the *Artificiall Turning water into Ice* (whereof we shall speake in another place) with *Aire* in place of *water*, and the *Ice* about it. And although it be a greater Alteration to turne *Aire* into *water*, than *water* into *Ice*: yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that *Artificiall Conuerfion* of *water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments
in Confort,
touching Indu-
ration of Bodies.

Induration, or *Lapidification*, of Substances more Soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Accelerating thereof is very worthy to be inquired. It is effected by three Meanes. The first is by *Cold*; whose Property is to *Condense*, and constipate, as hath beene said. The Second is by *Heat*; which is not proper, but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And vpon that, the more grosse of the Tangible Parts doe contract and serre themselves together; Both to A-void *Vacuum* (as they call it;) And also to Munit themselves against the Force of the *Fire*, which they haue suffered. And the Third is by *Assimilation*; when a Hard Body Assimilath a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay: And so of *Mineralls*, which come (no doubt) at first, of luyces Concrete, which afterward indurate: And so of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And so the Making of *Bricke*, and *Tile*: Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, and *Cryfall*, which harden

den with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, and *Spiders*, which are found in it; And many more: But wee will speake of them distinctly.

For *Indurations* by *Cold*, there bee few *Trialls* of it; For wee haue no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the *Sunne*, and the *Heauens*. The likeliest *Triall* is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* actiuated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres; So it may be, it will turne *wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conseruing Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Nitre*,) a *Peece* of *Wood*, or a *Peece* of *Tough Clay*, and let it lye a *Moneth*, or more.

Another *Triall* is by *Metalline waters*, which haue virtuall *Cold* in them. Put therefore *Wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And try whether it will not harden in some reasonable time. But I vnderstand it, of *Metalline waters*, that come by *Washing*, or *Quenching*; And not of *Strong Waters* that come by dissolution; for they are too *Corrosiue* to consolidate.

It is already found, that there are some *Naturall Spring-waters*, that will *Inlapidate Wood*; So as you shall see one *peece* of *Wood*, whereof the *Part* aboue the *Water* shall continue *Wood*; And the *Part* vnder the *Water* shall be turned into a kinde of *Granelly Stone*. It is likely those *Waters* are of some *Metalline Mixture*; But there would be more particular *Inquiry* made of them. It is certaine, that an *EGge* was found, hauing li- en many yeeres in the bottome of a *Moate*, where the *Earth* had some- what ouergrown it; And this *EGge* was comen to the *Hardnesse* of a *Stone*; And had the *Colours* of the white and yolke perfect: And the *Shell* shining in small graines like *Sugar*, or *Alablaster*.

Another *Experience* there is of *Induration* by *Cold*, which is already found; which is, that *Mettalls*, themselues are hardned by often *Heating* and *Quenching* in *Cold Water*: For *Cold* ever worketh most po- tently vpon *Heat* precedent.

For *Induration* by *Heat*, it must be considered, that *Heat*, by the *Exha- ling* of the *Moister Parts*, doth either harden the *Body*; As in *Bricks*, *Tiles*, &c; Or if the *Heat* be more fierce, maketh the *grosser part* it selfe, *Runne* and *Melt*; As in the making of ordinary *Glasse*; And in the *Vitri- fication* of *Earth*, (As wee see in the *Inner Parts* of *Furnaces*;) And in the *Vitri- fication* of *Brick*; And of *Mettalls*. And in the former of these, which is the *Hardening* by *baking*, without *Melting*, the *Heat* hath these degrees; First it *Indurateth*; and then maketh *Fragile*; And lastly it doth *Incine- rate* and *Calcinate*.

But if you desire to make an *Induration* with *Toughnesse*, and lesse *Fragility*; A middle way would be taken; Which is that which *Aristotle* hath well noted; But would be thoroughly verified. It is, to decoct *Bodies* in

water, for two or three dayes ; But they must bee such Bodies, into which the *Water* will not enter ; As *Stone*, and *Mettall*. For if they be Bodies into which the *Water* wil enter, then long Seerhing, will rather Soften than indurate them. As hath beene tried in *Eggs* &c. Therefore, Softer Bodies must be put into Bottles ; And the Bottles hung into *Water* seething, with the mouths open, aboue the *Water* ; that no *Water* may get in ; For by this Meanes, the virtuall *Heat* of the *Water* will enter ; And such a *Heat*, as will not make the Body adust, or fragile ; But the Substance of the *Water* will be shut out. This *Experiment* wee made ; And it sorted thus. It was tried with a Peece of *Free-stone*, and with *Pewter*, put into the *Water* at large. The *Free-stone* we found receiued in some *water* ; For it was softer, and easier to scrape, then a peece of the same *Stone* kept drie. But the *Pewter* into which no *water* could enter, became more white, and liker to *Siluer*, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, and a Peece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone* ; The *Cheese* likewise very hard, and not well to be cut : The *Chalke* and the *Free-stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to white, as in ordinary Drying by the Sunne. Note, that all the former Trialls were made by a Boyling vpon a good hot Fire, renewing the *water* as it consumed, with other hot *water* ; But the Boyling was but for twelue houres onely ; And it is like that the Experiment would haue beene more effectually, if the Boyling had beene for two or three daies, as we prescribed before.

89 As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) wee see Examples of it in some *Stones* in *Clay-Grounds*, lying neare to the top of the Earth, where *Pebble* is ; In which you may manifestly see diuers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themselves : And it were good to make a Triall of purpose, by taking *Clay*, and putting in it diuers *Pebble-Stones*, thicke set, to see whether in continuance of time, it will not be harder then other *Clay* of the same lump, in which no *Pebbles* are set. Wee see also in Ruines of old Walls, especially towards the bottome, the *Mortar* will become as hard as the *Brick* ; wee see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder then the *wood* it selfe ; And Scales likewise grow to the *Teeth*, harder then the *Teeth* themselves.

90 Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures* : For no Nourishment that the *Tree* receiueth, or that the *living Creature* receiueth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment
Solitary touching the Per-
sion of water into
Aire.

The Eye of the vnderstanding, is like the Eye of the Sense : For as you may see gre't Obiects through small Crannies, or Leuells ; So you may

may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* vpon watry *Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh vp suddenly. But the like *Cloud*, if it were *Oily*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth vpon *Water*; And *Flame*, and *Fire*, vpon *Oyle*; And therefore, to take out a Spot of Grease, they vse a *Coale* vpon browne Paper; because *Fire* worketh vpon Grease, or *Oyle*, as *Aire* doth vpon *Water*. And we see *Paper oyled*, or *Wood oyled*, or the like, last long moist; but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* meddeth little with the *Moisture* of *Oyle*.

There is an Admirable demonstration, in the same trifling *Instance* of the little *Cloud* vpon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force of Vnion*, euen in the least Quantities, and weakest Bodies, how much it Conduceth to Preservation of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*; And you shall see it euer breake vp, first in the Skirts, and last in the midst. We see likewise, that much *Water* draweth forth the Iuyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation vpon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiue many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Actiue Body, that should subdue it.

We haue spoken before, in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; which is by the Finenesse of the Strainer; we will now endeavour to reduce the same *Axiome* to a *Worke*. For this Writing of our *Sylua Sylvarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description only of Nature, but a Breaking of Nature, into great and strange Workes. Trie therefore, the Anointing ouer of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelps*, cutting their Haire as short as may be; Or of some other Beast; with some oyntment, that is not hurtfull to the Flesh; And that will harden, and sticke very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is receiued, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *White* is a penurious Colour, & where Moisture is scant. So *Blew Violets*, & other *Flowers*, if they be starued, turne Pale and *white*; *Birds*, and *Horses*, by Age, or Scarres, turne *white*: And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that

Experiment
Solitary touching the Force
of Vnion.

92

Experiment
Solitary touching the Producing of Feathers and Haires
of diuers Colours.

93

come first, will be many times of diuers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the Feathers will come *White*. This is a good *Experiment*, not only for the Producing of *Birds*, and *Beasts* of strange Colours; but also, for the Disclosure of the Nature of Colours themselves; which of them require a finer Porositie, and which a grosser.

Experiment
Solitary touch-
ing the Nour-
ishment of Li-
ving Creatures
before they be
brought forth.

94

It is a worke of Prouidence, that hath beene truly obserued by some; That the *Yolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *Yolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females *Wombe*; haue in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and seuered from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; But onely a quickening *Heat* when shee sitteth. But *Beasts*, and *Men* need not the matter of Nourishment within themselves; Because they are shaped within the *Wombe* of the Female, and are Nourished continually from her Body.

Experiments
in Colours tou-
ching Sympa-
thy and Anti-
pathy for Medi-
cinall vse.

95

It is an Inueterate and receiued Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Receiued, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to moue *Grauell*, and to dissolue the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe *Grauell*, as *Men* haue beene glad to remoue it; It was so violent.

96

It is receiued and confirmed by daily Experience, that the *Scales* of the *Feet* haue great Affinity with the *Head*, and the *Mouth* of the *Stomach*: As we see, *Going wet-shod*, to those that vse it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after drie the *Rheume*: And therefore a *Physitian*, that would be Mystically, prescribeth, for the Cure of the *Rheume*, that a *Man* should walke Continually vpon a *Camomill Alley*; Meaning, that he should put *Camomill* within his Sockes. Likewise *Pigeons bleeding*, applyed to the *Scales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applied vnto them, prouoke *Sleepe*.

97

It seemeth, that as the *Feet* haue a Sympathy with the *Head*; So the *Wrists* and *Hands*, haue a Sympathy with the *Heart*; We see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tried, that Iuyces of *Stock-Gilly-Flowers*, *Rose-Campian*, *Garlicke*, and other things; applied to the *Wrists*, and renewed; haue cured long *Agnes*. And I conceiue, that washing with certaine *Liquours*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agnes*, to hold in the *Hands*, *Egges of Alabaster*, and *Balls of Crystall*.

Of these things we shall speake more, when we handle the Title of Sympathy and Antipathy, in the proper Place.

The

Experiment
Solitary tou-
ching the Se-
cret Processes of
Nature.

98

The Knowledge of man (hitherto) hath beene determined by the View, or Sight; So that whatsoeuer is Inuisible, either in respect of the *Finenesse of the Body* it selfe; Or the *Smallnesse of the Parts*; Or of the *Subtily of the Motion*; is little inquired. And yet these be the Things that Gouverne Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumatics*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will haue them to be *Naturall Heat*, or a *Portion of the Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will haue them to be the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselves. And then, when they come to Plants and liuing Creatures, they call them *Soules*. And such Superficial Speculations they haue; Like *Prospectiues*, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in Nature. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, & included in the *Tangible Parts* of Bodies, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoeuer, more or lesse: And they are neuer (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colligation*, *Concoction*, *Maturation*, *Putrefaction*, *Vinification*, and most of the Effects of Nature: For, as we haue figured them in our *Sapientia Veterum*, in the Fable of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in Bodies are Stupide things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in Bodies, the industry of the *Chymists* hath giuen some light, in discerning by their Separations, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of Bodies, and the like. And the *Physicians* are content to acknowledge, that *Herbs*, and *Drugs* haue diuers Parts; As that *Opium* hath a *Stupefactive* Part, and a *Heating* Part; The one mouing Sleepe, the other a Sweat following; And that *Rubarb* hath *Purging* Parts, and *Astringent* Parts, &c. But this whole *Inquisition* is weakly and Negligently handled. And for the more subtile differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts* of Bodies, which doe so great Effects, they haue not beene obserued at all; because they are Inuisible, and incurre not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientia esse conuincitur; Atomum enim nemo unquam vidit*. And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all
Flight

Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall be thoroughly handled in due place,) is not scene at all. But neuerthelesse, if you know it not, or enquire it not attentiuely and diligently, you shall neuer be able to discern, and much lesse to produce, a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Enclosures of Bodies, whereby the effects (which were mentioned before) passe betweene the *Spirits*, and the *Tangible Parts*; (which are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Passions*, and such other *Logicall Words*.

Experiment
Solitary touching the
Power of Heat.

99

It is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewise, that the Effects of *Heat*, are most aduanced, when it worketh vpon a Body, without losse or dissipation of the Matter; for that euer betrayeth the Account. And therefore it is true, that the power of *Heat* is best perceiued in *Distillations*, which are performed in close Vessels, and Receptacles. But yet there is a higher Degree; For howsoeuer *Distillations* doe keepe the Body in Cells, and Cloisters, without Going abroad; yet they giue space vnto Bodies to turne into Vapour; To returne into Liqueur; And to Separate one part from another. So as *Nature* doth Expatiate, although it hath not full Liberty: whereby the true and Vltimate Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no such Reciprocation of *Rarefaction*, and of *Condensation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeues, will turne and change into many *Metamorphoses*. Take therefore a *Square Vessell* of *Iron*, in forme of a Cube, and let it haue good thicke and strong Sides. Put into it a Cube of *Wood*, that may fill it as close as may be; And let it haue a Couer of *Iron*, as strong (at least) as the Sides; And let it be well Luted, after the manner of the *Chymists*. Then place the *Vessell* within burning *Coales*, kept quicke kindled, for some few houres space. Then take the *Vessell* from the *Fire*, and take off the Couer, and see what is become of the *Wood*. I conceiue that since all *Inflammation*, and *Evaporation* are vtterly prohibited, and the *Body* still turned vpon it Selfe, that one of these two Effects will follow: Either that the *Body* of the *Wood* will be turned into a kinde of *Amalgama*, (as the *Chymists* call it;) Or that the Finer Part will be turned into *Aire*, and the Grosser sticke as it were baked, and incrustate vpon the Sides of the *Vessell*; being become of a Denfer Matter, than the *Wood* it selfe, Crude. And for another Triall, take also *Water*, and put it in the like *Vessell*, stopped as before; But vse a gentler *Heat*, and remoue the vessell sometimes from the *Fire*; And againe, after some small time, when it is Cold, renew the *Heating* of it: And repeat this *Alteration* some few times: And if you can once bring to passe, that the *Water*, which is one of the Simplest of Bodies, be changed in Colour, Odour, or Taste, after

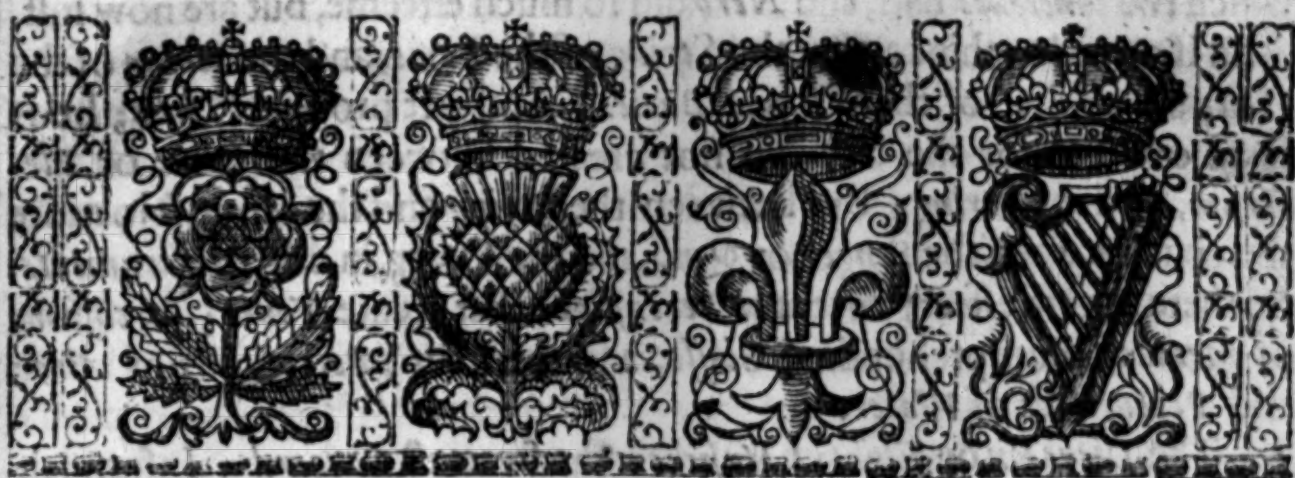
after the manner of Compound Bodies, you may be sure that there is a great Worke wrought in Nature, and a Notable Entrance made into strange Changes of Bodies, and productions: And also a Way made, to doe that by Fire, in small time, which the Sunne and Age do in long time. But of the Admirable Effects of this *Distillation in Close*, (for so we will call it) which is like the *Wombes* and *Matrices* of liuing creatures, where nothing Expireth, nor Separateth; We will speake fully, in the due place; Not that we Aime at the making of *Paracelsus Pigmeys*; Or any such Prodigious Follies; But that we know the Effects of *Heat* will be such, as will scarce fall vnder the Conceit of Man; If the force of it be altogether kept in.

There is nothing more Certaine in Nature, than that it is impossible for any *Body*, to be vtterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *Sect* of the *Chymists*; That there is no such way to effect the Strange *Transmutations* of *Bodies*, as to endeouour and vrge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preservation of Bodies from Change; For if you can prohibit, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adiacent*, because they are vtterly Heterogeneall; Nor make a *Round* and *Circulation* within themselues; they will neuer change, though they be in their Nature neuer so Perishable, or Mutable. We see, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceiue the like will be of *Bodies* put into *Quick-siluer*. But then they must be but thinne; As a leafe, or a peece of Paper, or Parchment; For if they haue a greater Crassitude, they will alter in their owne Body, though they spend not. But of this, We shall speake more, when we handle the *Title* of *Conservation* of *Bodies*.

Experiment Solitary, touching the Impossibility of Annihilation.

100

NATV-



NATVRALL HISTORIE.

II. Century.



MVSICKE in the *Practise*, hath bin well pursued; And in good Variety; But in the *Theory*, and especially in the *Reelding* of the *Causes* of the *Practique*, very weakly; Being reduced into certaine Mysti- call Subtillties, of no vse, and not much Truth. We shall therefore, after our manner, ioyne the *Contemplatiue* and *Actiue Part* together.

Experiments
in Consort
touching Mu-
sicke.

All *Sounds*, are either *Musicall Sounds*, which we call *Tones*; Wher- unto there may be an *Harmony*; which *Sounds* are euer *Equall*; As *Sing- ing*, the *Sounds of Stringed*, and *Wind-Instruments*, the *Ringings of Bells*, &c. Or *Immusicall Sounds*; which are euer *Vaequall*; Such as are the *Voice in Speaking*, all *Whisperings*, all *Voices of Beasts*, and *Birds*, (except they bee *Singing Birds*;) all *Percussions*, of *Stones*, *Wood*, *Parchment*, *Skins* (as in *Drummes*;) and infinite others.

101

The *Sounds* that produce *Tones*, are euer from such *Bodies*, as are in their *Parts* and *Pores Equall*; As well as the *Sounds* themselues are *E- quall*; And such are the *Percussions* of *Metall*, as in *Bells*; Of *Glasse*, as in the *Fillipping* of a *Drinking Glasse*; Of *Aire*, as in *Mens voices* whilest they *Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*; as in the *Nightingale-Pipes* of *Regalls*, or *Organs*, and other *Hydranlickes*; which

102

which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man thinke, that the *String* of the *Bowe*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created between the *Bowe* or *Plectrum*, and the *String*; But between the *String* and the *Aire*; No more then it is between the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that create *Tones*; *Percussions* of *Metalls*, (comprehending *Glasse*, and the like;) *Percussions* of *Aire*; and *Percussions* of *Water*.

103

The *Diapason* or *Eight* in *Musicke* is the sweetest *Concord*; Inasmuch, as it is in effect an *Unison*; As we see in *Lutes*, that are strung in the *Base Strings* with two strings, one an *Eight* above another; Which make but as one *Sound*. And every *Eighth Note* in Ascent, (as from *Eight* to *Fifteene*: from *Fifteene* to *twenty two*, and so in infinitum,) are but *Scales of Diapason*. The *Cause* is darke, and hath not beene rendred by any; And therefore would be better contemplated. It seemeth that *Aire*, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath beene said) admitteth much *Varietie*; As wee see in the *Voices* of *Living Creatures*; And likewise in the *Voices* of severall *Men*; (for we are capable to discern severall *Men* by their *Voices*;) And in the *Coniugation of Letters*, whence *Articulate Sounds* proceed; Which of all others are most various. But in the *Sounds* which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it selfe into any such *varietie*; But is forced to recurre into one and the same *Posture* or *Figure*, onely differing in *Greatnesse* and *Smalnesse*. So we see *Figures* may be made of lines, *Crooked* and *Straight*, in infinite *Varietie*, where there is *Inequality*; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of *Equall lines*) can differ but in *Greater*, or *Lesser*.

104

It is to be noted (the rather lest any Man should thinke, that there is any thing in this *Number of Eight*, to create the *Diapason*), that this *Computation of Eight*, is a thing rather received, than any true *Computation*. For a true *Computation* ought ever to bee, by *Distribution* into *equall Portions*. Now there be interuenient in the *Rise of Eight* (in *Tones*) two *Beemolls*, or *Halfe-notes*; So as if you diuide the *Tones* equally, the *Eight* is but *Seuen* whole and *equall Notes*; And if you subdiuide that into *Halfe Notes*, (as it is in the *Stops of a Lute*), it maketh the *Number of thirteene*.

105

Yet this is true; That in the ordinary *Rises* and *Falles* of the *Voice* of *Man*, (not measuring the *Tone* by whole *Notes*, and halfe *Notes*, which is the *Equall Measure*;) there fall out to be two *Beemolls* (as hath beene said) betweene the *Unison* and the *Diapason*: And this *Varying* is natural. For if a *Man* would endeavour to raise or fall his *Voice*, still by *Halfe-Notes*, like the *Stops of a Lute*; or by whole *Notes* alone, without *Halves*; as farre as an *Eight*; he will not be able to frame his *Voice* vnto it. Which sheweth, that after every three whole *Notes* Nature requireth, for all *Harmonically* use, one *halfe Note* to be interposed.

106

It is to be considered, that whatsoever *Vertue* is in *Numbers*, for
Conducing

Conducing to Conccent of *Notes*, is rather to bee ascribed to the *Ante-Number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelve*; So that the *Seuenth*, or the *Thirteenth*, is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seuenth* and the *Thirteenth* are but the limits and Boundaries of the *returne*.

The *Concords* in *Musick* which are *Perfect*, or *Semiperfect*, betweene the *Vnison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect*; the *Third* next; And the *Sixth* which is more harsh: And as the Ancients esteemed, and so doe my selfe and some Other yet, the *Fourth* which they call *Diatessaron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so in *infinitum*; they be but *Recurrances* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eight* respectiue from them.

For *Discords*, the *Second*, and the *Seuenth*, are of all others the most odious, in *Harmony*, to the *Sense*; whereof the One is next aboue the *Vnison*, the Other next vnder the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*.

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturbe the *Harmony*, though there be a *Discord* to the *Higher Parts*; So the *Discord* be not of the *Two* that are Odious; And therefore the ordinary *Conccent* of *Four* *Parts* consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cause* is, for that the *Base* striking more *Aire*, doth ouercome and drowne the *Treble*, (vnlesse the *Discord* be very Odious;) And so hideth a small Imperfection. For we see, that in one of the *lower Strings* of a *Lute*, there soundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the *Sound* of the *Base*.

We haue no *Musicke* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For we see the *Halfe-Notes* themselues doe but interpose sometimes. Neuerthelesse we haue some *Slides*, or *Relishes*, of the *Voice*, or *Strings*, as it were continued without *Notes*, from one *Tone* to another, rising or falling, which are delightfull.

The *Causes* of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receiue light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There be two Things *Pleasing* to the *Sight*, (leauing *Pictures*, and *Shapes* aside, which are but *Secondary Obiects*; And please or displease but in *Memory*;) these two are, *Colours*, and *Order*. The *Pleasing* of *Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*; But the *Pleasing* of *Order* doth symbolize with *Harmony*. And therefore we see in *Garden-knots*, and the *Frets* of *Houses*, and all equall and well-answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they please; whereas *unequall Figures* are but *Deformities*. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the *Effects* of *Equality*; *Good Proportion*, or *Correspondence*: So that (out of *Question*,) *Equality*, and *Correspondence*, are the *Causes* of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; wherof notwithstanding we shall speake somewhat, (when we handle *Tones*,) in the generall Enquiry of *Sounds*.

112

Tones are not so apt altogether to procure *Sleep*, as some other *Sounds*; As the *Wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cause* whereof is, for that *Tones*, because they are Equall, and slide not, doe more strike and erect the *Sense*, than the other. And Ouermuch Attention hindreth *Sleepe*.

113

There be in *Musick* certaine *Figures*, or *Tropes*; almost agreeing with the *Figures* of *Rhetoricke*; And with the *Affections* of the *Minde*, and other *Senses*. First, the *Diuisiō* and *Quauering*, which please so much in *Musick*, haue an Agreement with the *Glittering of Light*; As the *Moone-Beames* playing vpon a *Waue*. Againe, the *Falling* from a *Discord* to a *Concord*, which maketh great Sweetnesse in *Musick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after some dislikes: It agreeth also with the *Taste*, which is soone gluttred with that which is sweet alone. The *Sliding from the Close* or *Cadence*, hath an Agreement with the *Figure* in *Rhetoricke*, which they call *Prater Expectatum*; For there is a Pleasure euen in *Being deceived*. The *Reports*, and *Fuges*, haue an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of Times*, haue an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Measure Time*, are in the *Medley* of one *Dance*.

114

It hath been anciently held, and obserued, that the *Sense of Hearing*, and the *Kinds of Musick*, haue most Operation vpon *Manners*; As to *Incourage Men*, and make them warlike; To make them Soft and Effeminate; To make them Graue; To make them Light; To make them Gentle and inclined to *Pitty*, &c. The *Cause* is, for that the *Sense of Hearing* striketh the *Spirits* more immediatly, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, haue their *Organs*, not of so present and immediate Access to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediatly vpon the *Spirits*, and is forcible while the *Obiect* remaineth,) it is with a Communication of the *Breath*, or *Vapour* of the *Obiect Odorate*: But *Harmony* entring easily, and Mingling not at all, and Comming with a manifest Motion; doth by Custome of often Affecting the *Spirits*, and Putting them into one kinde of Posture, alter not a little the Nature of the *Spirits*, euen when the *Obiect* is removed. And therefore we see, that *Tunes* and *Aires*, euen in their owne Nature, haue in themselves some Affinity with the *Affections*; As there be *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens mindes to Pitty*; *Warlike Tunes*; &c. So as it is no Maruell, if they alter the *Spirits*; considering that *Tunes* haue a Predisposition to the Motion of the *Spirits* in themselves. But yet it hath been noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of Passions, conforme vnto them; yet generally, *Musick* feedeth that disposition of the *Spirits* which it findeth. We see also that seuerall *Aires*, and *Tunes*, doe please seuerall *Nations*, and *Persons*, according to the Sympathy they haue with their *Spirits*.

Perspectiue hath been with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as far as concerneth *Musick*. But the *Nature of Sounds* in generall, hath been superficially obserued. It is one of the subtillest Peecces of Nature. And besides, I practise, as I doe aduise; which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subiect, which is Immaterial, or lesse Material; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heauens* turne about, in a most rapide Motion, without *Noise* to vs perceiued; Though in some *Dreames* they haue been said to make an excellent *Musick*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And, if it be thought, that it is the Greatnesse of distance from vs, whereby the *Sound* cannot be heard; We see that *Lightnings*, and *Coruscations*, which are neere at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Diuision of the *Aire*. The *Windes* in the *Vpper Region* (which moue the *Clouds* about (which we call the *Racke*) and are not perceiued below) passe without *Noise*. The *lower Windes* in a Plaine, except they be strong, make no *Noise*; But amongst *Trees*, the *Noise* of such *Windes* will be perceiued. And the *Windes* (generally) when they make a *Noise*, doe euer make it vnequally, Rising and Falling, and sometimes (when they are vehement,) Trembling at the Height of their Blast. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing through the *Aire*, till it fall vpon the Ground, Water, Houses, or the like. *Water* in a *Riuer* (though a swift Streame) is not heard in the Channell, but runneth in Silence, if it be of any depth; But the very *Streame* vpon *Shallowes*, of *Grauell*, or *Pebble*, will be heard. And *Waters*, when they beat vpon the Shore, or are straitned, (as in the falls of *Bridges*;) Or are dashed against themselues, by *Windes*, giue a Roaring *Noise*. Any peece of *Timber*, or *Hard Body*, being thrust forwards by another Body Contiguous, without knocking, giueth no *Noise*. And so *Bodies* in weighing, one vpon another, though the *upper Body* presse the *lower Body* downe, make no *Noise*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though vnobserued;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced onely by the Breaking of the *Aire*; And not by the Impulsion of the Parts. So it is manifest; That where the Anterior Body giueth way, as fast as the Posterior commeth on, it maketh no *Noise*; be the *Motion* neuer so great, or swift.

Aire open, and at large, maketh no *Noise*, except it be sharply percussed; As in the *Sound* of a String, where *Aire* is percussed by a hard, and

Experiments
in Consort
touching
Sounds; and
first touching
the Nullity,
and Entity of
Sounds.

115

116

and stiffe Body; And with a sharp loose; For if the String be not straitned, it maketh no *Noise*. But where the *Aire* is pent, and straitned, there Breath, or other Blowing, (which carry but a gentle Percussion,) suffice to create *Sound*; As in *Pipes*, and *winde-Instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the *Concaue* of the *Pipe*, were it not for the *Fipple*, that straitneth the *Aire*, (much more than the *Simple Concaue*;) would yeeld no *Sound*. For as for other *winde-Instruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters-hornes*, &c. Which appeareth by the blowne-checks of him that windeth them. *Organs* also are blowne with a strong winde, by the *Bellows*. And note againe, that some kinde of *winde-Instruments*, are blowne at a small Hole in the side, which straitneth the Breath at the first Entrance; The rather, in respect of their *Traverse*, and *Stop* about the Hole, which performeth the *Fipples* Part; As it is scene in *Flutes*, and *Fifes*, which will not giue *Sound*, by a Blast at the end, as *Recorders*, &c. doe. Likewise in all *Whistling*, you contract the Mouth; And to make it more sharp, Men sometimes vse their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they giue no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Casting; Which Hollownesse penneth the *Aire*: Nor yet *Arrows*, except they be ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small whistles*, or *Shepheards Oaten Pipes*; they giue a *Sound*, because of their extreame Slenderness, whereby the *Aire* is more pent, than in a *Wider Pipe*. Again, the *Voices* of *Men*, and *Liuing Creatures*, passe through the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a sharp Percussion; And besides, hath the vantage of penning the *Aire* in the Mouth.

117

Solide Bodies, if they be very softly percussed, giue no *Sound*; As when a man treadeth very softly vpon *Boards*. So *Chests* or *Doores* in faire weather, when they open easily, giue no *Sound*. And *Cart-wheels* squeak not, when they are liquoured.

118

The *Flame* of *Tapers*, or *Candles*, though it be a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*. *Aire* in *Ovens*, though (no doubt) it doth (as it were) boyle, and dilate it selfe, and is re-percussed; yet it is without *Noise*.

119

Flame percussed by *Aire*, giueth a *Noise*; As in Blowing of the Fire by *Bellows*; Greater, than if the *Bellows* should blow vpon the *Aire* it selfe. And so likewise *Flame* percussing the *Aire* strongly, (as when *Flame* suddenly taketh, and openeth,) giueth a *Noise*; So, *Great Flames*, whiles the one impelleth the other, giue a bellowing *Sound*.

120

There is a Conceit runneth abroad, that there should be a *white Powder*, which will discharge a Peece without *Noise*; which is a dangerous Experiment, if it should be true: For it may cause secret Murthers. But it seemeth to me vnpossible; For, if the *Aire* pent, be driuen forth, and striketh the *Aire* open, it will certainly make a *Noise*. As for the *white Powder* (if any such thing be, that may extinguish, or dead the *Noise*,) it

it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may be extinguished, or deaded, by discharging the *Pent Aire*, before it cometh to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more diuided *Sounds*: As if you should make a Crosse Barrell hollow, thorow the Barrell of a *Peece*, it may be, it would giue seuerall *Sounds*, both at the Nose, and at the Sides. But I conceiue, that if it were possible, to bring to passe, that there should be no *Aire* pent at the Mouth of the *Peece*, the Bullet might fly with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* vpon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire*, that striketh vpon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must be made by taking some small *Concaue* of *Metall*, no more than you mean to fill with Powder; And laying the Bullet in the Mouth of it, halfe out into the *Open Aire*.

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to haue killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning-Glasse*, when shee walked in *Saint James Parke*, from the Leads of the House. But thus much (no doubt) is true; That if *Burning-Glasses* could be brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Nauy*,) the *Percussion* of the *Aire* alone, by such a *Burning-Glasse*, would make no *Noise*; No more than is found in *Cornscations*, and *Lightnings*, without *Thunders*.

I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conueighed to the *Sense*; As well as the *Impression* of *Species visible*: Or else they will not be heard. And therefore, as the Bullet moueth so swift, that it is *Inuisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For we see, that the Apprehension of the *Eye*, is quicker than that of the *Eare*.

All *Eruptions* of *Aire*, though small and slight, giue an *Entity of Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-salts*, and *Bay-leaves*, cast into the Fire; So in *Chestnuts*, when they leape forth of the Ashes; So in *Greene Wood* laid vpon the Fire, especially *Roots*; So in *Candles* that spit Flame, if they be wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose-leaf* gathered together into the fashion of a Purse, and broken vpon the Fore-head, or Backe of the Hand, as Children vse.

The Cause giuen of *Sound*, that it should be an *Elision* of the *Aire* (wherby, if they meane any thing, they meane a *Cutting*, or *Diuiding*, or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit vpon a few Instances; As the Manner is in the *Philosophy* Receiued. And it is common with Men, that if they haue

Experiments
in Cōsort tou-
ching Producti-
on, Conservation,
and Delation
of Sounds; And

the Office of
the Aire there-
in.

124

haue gotten a Pretty Expression, by a Word of Art, that Expression goeth curreant; though it be empty of Matter. This Conceit of Elision, appeareth most manifestly to be false, in that the Sound of a Bell, String, or the like, continueth melting, some time, after the Percussion; But ceaseth straight-waies, if the Bell, or String, be touched and stayed: whereas, if it were the Elision of the Aire, that made the Sound, it could not be, that the Touch of the Bell, or String, should extinguish so suddenly that Motion, caused by the Elision of the Aire. This appeareth yet more manifestly, by Chiming with a Hammer, vpon the Out-side of a Bell; For the Sound will be according to the inward Concaue of the Bell; whereas the Elision, or Attenuation of the Aire, cannot be but onely betweene the Hammer, and the Out-side of the Bell. So againe, if it were an Elision, a broad Hammer, and a Bodkin, stricke vpon Metall, would giue a diuers Tone; As well as a diuers Loudnesse: But they doe not so; For though the Sound of the one be Louder, and of the other Softer, yet the Tone is the same. Besides, in Eccho's, (wherof some are as loud as the Originall Voice,) there is no new Elision; but a Repercussion onely. But that which conuinceth it most of all, is; that Sounds are generated, where there is no Aire at all. But these and the like Conceits, when Men haue cleared their vnderstanding, by the light of Experience, will scatter, and breake vp like a Mist.

125

It is certaine, that Sound is not produced at the first, but with some Locall Motion of the Aire, or Flame, or some other Medium; Nor yet without some Resistance, either in the Aire, or the Body Percussed. For if there be a meere Yeelding, or Cession, it produceth no Sound; As hath beene said. And therein Sounds differ from Light, and Colours; which passe thorow the Aire, or other Bodies, without any Locall Motion of the Aire; either at the first, or after. But you must attentiuely distinguish, betweene the Locall Motion of the Aire, (which is but *Vehiculum Causse*, A Carrier of the Sounds,) and the Sounds themselues, Conueighed in the Aire. For as to the former, we see manifestly, that no Sound is produced (no not by Aire it selfe against other Aire, as in Organs, &c.) but with a perceptible Blast of the Aire; And with some Resistance of the Aire stricken. For euen all Speech, (which is one of the gentlest Motions of Aire,) is with Expulsion of a little Breath. And all Pipes haue a Blast, as well as a Sound. We see also manifestly, that Sounds are carried with Wind: And therefore Sounds will be heard further with the Wind, than against the Wind; And likewise doe rise and fall with the Intension or Remission of the Wind. But for the Impression of the Sound, it is quite another Thing; And is vtterly without any Locall Motion of the Aire, Perceptible; And in that resembleth the Species visible: For after a Man hath lured, or a Bell is rung, we cannot discerne any Perceptible Motion (at all) in the Aire, a long as the Sound goeth; but only at the first. Neither doth the Wind (as far as it carrieth a Voice,) with the Motion therof, confound any of the Delicate, and Articulate Figurations of the Aire, in Variety of Words. And if a Man speake a good loudnesse, against the

the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the Mouth; As *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *speaking*, will moue the *Candle* far more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation* of *Things visible*; Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

Neuerthelesse it is true, that vpon the *Noise* of *Thunder*, and great *Ordnance*; *Glasse* windowes will shake; and *Fishes* are thought to be frayed with the *Motion*, caused by *Noise* vpon the water. But these Effects are from the *Locall Motion* of the *Aire*, which is a *Concomitant* of the *Sound*, (as hath beene said;) and not from the *Sound*.

126

It hath beene anciently reported, and is still receiued, that *Extreme Applauses*, and *Shouting of People* assembled in great *Multitudes*, haue so rarified, and broken the *Aire*, that *Birds* flying ouer, haue fallen downe, the *Aire* being not able to support them. And it is beleeued by some, that *Great Ringing of Bells* in populous *Cities*, hath chased away *Thunder*: and also dissipated *Pestilent Aire*: All which may be also from the *Concussion* of the *Aire*, and not from the *Sound*.

127

A very great *Sound*, neare hand, hath stricken many *Deafe*; And at the *Instant* they haue found, as it were, the breaking of a *Skin* or *Parchment* in their *Eare*: And my *Selfe* standing neare one that *Lured* loud, and shrill, had suddenly an *Offence*, as if somewhat had broken, or beene dislocated in my *Eare*; And immediately after, a *loud Ringing*; (Not an ordinary *Singing*, or *Hissing*, but far louder, and differing;) so as I feared some *Deafenesse*. But after some halfe *Quarter* of an *Houre* it vanished. This Effect may be truly referred vnto the *Sound*: For (as is commonly receiued) an *ouer-potent Object* doth destroy the *Sense*; And *spirituall Species*, (both *Visible*, and *Audible*,) will worke vpon the *Sensories*, though they moue not any other *Body*.

128

In *Delation of Sounds*, the *Enclosure* of them preserueth them, and causeth them to be heard further. And wee finde in *Roules* of *Parchment*, or *Trunckes*, the Mouth being laid to the one end of the *Rowle* of *Parchment*, or *Truncke*, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The *Cause* is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; But in such *Concaues* it is conserued, and contracted. So also in a *Peece* of *Ordnance*, if you speak in the *Touch-hole*, and another lay his *Eare* to the Mouth of the *Peece*, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

129

It is further to be considered, how it proueth and worketh, when the *Sound* is not enclosed all the *Length* of his *Way*, but passeth partly through open *Aire*; As where you *speake* some distance from a *Truncke*; or where the *Eare* is some distance from the *Truncke*, at the other *End*; Or where both *Mouth* and *Eare* are distant from the *Truncke*. And

130

it is tried, that in a long *Truncke*, of some eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Truncke*; And somewhat more holpen, when the *Eare* of the *Hearer* is neare, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from *abroad*, than *abroad* from within the *Chamber*.

131

As the *Enclosure*, that is *Round about and Entire*, preferueth the *Sound*; So doth a *Semi-Concave*, though in a lesse degree. And therefore, if you diuide a *Truncke*, or a *Cane* into two, and one speake at the one end, and you lay your *Eare* at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concave*; but if you doe the like vpon the *Mast* of a *Ship*, or a long *Pole*, or a *Peece of Ordnance* (though one speake vpon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, than in the *Aire* at large.

132

It would be tried, how, and with what proportion of disadvantage, the *Voice* will be carried in an *Horne*, which is a line Arched; Or in a *Trumpet*, which is a line Retorted; Or in some *Pipe* that were *Sinuuous*.

133

It is certaine, (howsoeuer it crosse the Receiued Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the most fauourable *Deferent* of *Sounds*. Take a *Vessell* of *Water*, and knap a paire of Tongs some depth within the *Water*, and you shall heare the *Sound* of the Tongs well, and not much diminished; And yet there is no *Aire* at all present.

134

Take one *Vessell* of *Siluer*, and another of *Wood*, and fill each of them full of *Water*, and then knap the Tongs together, as before, about an handfull from the Bottome, and you shall finde the *Sound* much more Resounding from the *Vessell* of *Siluer*, than from that of *Wood*: And yet if there be no water in the *Vessell*, so that you knap the Tongs in the *Aire*, you shall finde no difference, betweene the *Siluer* and *Woodden Vessell*. Whereby, beside the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communicateth with the Bottome of the *Vessell*: The other, that such a Communication passeth farre better, thorow *Water*, than *Aire*.

135

Strike any *Hard Bodies* together, in the Middest of a *Flame*, and you shall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

136

The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath some Affinity with the *Aire*, performeth, in some degree, the Parts of the *Aire*; As when you knocke vpon an *Emptie Barrell*, the *Sound* is (in part) created by the *Aire* on the Out-side; And (in part) by the *Aire* in the Inside; For the *Sound* will be greater or lesser, as the *Barrell* is more Emptie, or more full; But yet the *Sound* participateth also with the *Spirit* in the *Wood*, thorow which it passeth, from the Outside to the Inside: And so it commeth to passe, in the *Chiming* of *Bells*, on the Out-side; where also the *Sound* passeth to the Inside: And a number of other

ther like Instances, whereof we shall speake more, when we handle the *Communication of Sounds*.

It were extreame Grossenesse to thinke (as wee haue partly touched before) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula Motus*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first *Motion* of the *String*; but by the *Returne* or *Result* of the *String*, which was strained by the *Touch*, to his former Place; which *Motion* of *Result* is quicke and sharpe; Whereas the first *Motion*, is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*.

Take a *Truncke*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is, for that *Sound* diffuseth it selfe in round; And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be made to goe all into a Canale; It must needs giue greater force to the *Sound*. And so you may note, that *Enclosures* doe not onely preserue *Sound*, but also Encrease and Sharpen it.

A *Hunters Horne*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause* is, for that the *Aire*, and *Sound*, being first contracted at the lesser End, and afterwards hauing more Roome to spread at the greater End; doe dilate themselues; And in Comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And euen *Hunters Hornes*, which are sometimes made straight, and not Oblique, are euer greater at the lower end. It would be tried also in *Pipes*, being made far larger at the lower End: Or being made with a *Belly* towards the lower End; And then issuing into a straight *Concaue* againe.

There is in *Saint James Fields*, a *Conduit* of *Bricke*, vnto which ioyneth a low *Vault*; And at the End of that, a *Round House* of *Stone*; And in the *Bricke Conduit* there is a *Window*; And in the *Round House* a *Slit* or *Rift* of some little breadth: If you crie out in the *Rift*, it will make a fearfull Roaring at the *Window*. The *Cause* is the same with the former; For that all *Concaues*, that proceed from more Narrow to more Broad, doe amplifie the *Sound* at the Comming out.

Hawkes Bells, that haue Holes in the Sides, giue a greater Ring, than if the *Pellet* did strike vpon *Brasse*, in the *Open Aire*. The *Cause* is the same with the first Instance of the *Truncke*; Namely, for that the *Sound* Enclosed with the Sides of the *Bell*, commeth forth at the *Holes* vnspent, and more strong.

In *Drums*, the *Clofenesse* round about, that preserueth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum-Hole*, farre more loud, and strong, than if you should strike vpon the like *Skin*, extended

137

Experiments
in Cōsort touching the
Magnitude, and Ex-
tensity, and Damps
of Sounds.

138

139

140

141

142

tended in the Open Aire. The Cause is the same with the two precedent.

143

Sounds are better heard, and further off, in an Evening, or in the Night, than at the Noone, or in the Day. The Cause is, for that in the Day, when the Aire is more Thin, (no doubt) the Sound pierceth better; But when the Aire is more Thicke, (as in the Night) the Sound spendeth and spreadeth abroad lesse: And so it is a Degree of Enclosure. As for the Night, it is true also, that the Generall Silence helpeth.

144

There be two Kinds of Reflexions of Sounds; The one at Distance, which is the Echo; Wherein the Originall is heard distinctly, and the Reflexion also distinctly; Of which we shall speake hereafter: The other in Concurrence; When the Sound Reflecting (the Reflexion being neare at hand) returneth immediatly vpon the Originall, and so iterateth it not, but amplifieth it. Therefore we see, that Musicke vpon the water soundeth more; And so likewise Musicke is better in Chambers Wainscotted, than Hanged.

145

The Strings of a Lute, or Violl, or Virginals, doe giue a far greater Sound, by reason of the Knot, and Board, and Concave vnderneath, than if there were nothing but onely the Flat of a Board, without that Hollow and Knot, to let in the Vpper Aire into the Lower. The Cause is, the Communication of the Vpper Aire with the Lower; And Penning of both from Expencc, or Dispersing.

146

An Irish Harpe hath Open Aire on both sides of the Strings: And it hath the Concave or Belly, not along the Strings, but at the End of the Strings. It maketh a more Refounding Sound, than a Bandora, Orpharion, or Citterne, which haue likewise Wire-strings. I iudge the Cause to be, for that Open Aire on both Sides helpeth, so that there be a Concave; Which is therefore best placed at the End.

147

In a Virginal, when the Lid is downe, it maketh a more exile Sound, than when the Lid is open. The Cause is, for that all Shutting in of Aire, where there is no competent Vent, dampeth the Sound. Which maintaineth likewise the former Instance; For the Belly of the Lute, or Violl, doth pen the Aire somewhat.

148

There is a Church at Gloucester, (and as I haue heard the like is in some other places;) where if you speake against a Wall, softly, another shall heare your Voice better a good way off, than neare hand. Enquire more particularly of the Frame of that Place. I suppose there is some Vault, or Hollow, or Isle, behinde the Wall, and some Passage to it towards the further end of that Wall, against which you speake; So as the Voice, of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the Aire of the Hollow; For it is preserved somewhat by the plaine wall; but that is too weake to giue a Sound Audible, till it hath communicated with the backe Aire.

149

Strike vpon a Bowstring, and lay the Horne of the Bow neare your Eare, and it will encrease the Sound, and make a degree of a Tone. The Cause is, for that the Sensory, by reason of the Close Holding, is percussed,

cuffed, before the Aire disperſeth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse betwene those two Parts; As appeareth by this; That a Harsh *Grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put vpon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike vpon the other, it maketh a far greater *Sound*, than the like Stroke vpon the *Rod*, not so made Contiguous to the Eare. By which, and by some other *Instances*, that haue beene partly touched, it should appeare; That *Sounds* doe not onely slide vpon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body.

I remember in *Trinity Colledge* in *Cambridge*, there was an *Vpper Chamber*, which being thought weake in the Roofe of it, was supported by a Pillar of *Iron*, of the bignesse of ones Arme, in the middest of the *Chamber*; Which if you had stricke, it would make a little flat Noise in the *Roome* where it was stricke; But it would make a great *Bombe* in the *Chamber* beneath.

The *Sound* which is made by *Buckets* in a *Well*, when they touch vpon the *Water*; Or when they strike vpon the side of the *Well*; Or when two *Buckets* dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *Open Aire*. The Cause is, the Penning and Enclosure of the Aire, in the Concaue of the *Well*.

Barrells placed in a *Roome* vnder the Floare of a *Chamber*, make all *Noises* in the same Chamber, more Full and Resounding.

So that there be five wayes (in generall,) of Maioration of Sounds: Enclosure Simple; Enclosure with Dilatation; Communication; Reflexion Concurrent; and Approach to the Senſory.

For Exility of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth passe thorow *Solide* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Close Body, and such an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weaknesse*, or *Exility*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noise, or Rattle. And so doth the *Aëtites*, or *Eagles Stone*, which hath a little Stone within it.

And as for *Water*, it is a certaine Triall: Let a Man goe into a *Bath*, and take a *Pail*, and turne the Bottome vpward, and carry the Mouth of it, (Even,) downe to the Leuell of the *Water*; and so presse it downe vnder the *Water*, some handfull and an halfe, still keeping it even, that it may not tilt on either side, & so the Aire get out: Then let him that is in the *Bath*, diue with his Head so far vnder *Water*, as he may put his Head into the *Pail*; & there wil come as much *Aire* bubling forth, as wil make

Roome

150

151

152

153

154

155

Room for his Head. Then let him speak; and any that shal stand without, shal heare his *Voice* plainly; but yet made extreme sharp and exile, like the *Voice* of *Puppets*; But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handsomely done, if the *Pail* be put ouer the Mans head aboue *Water*, and then he cower downe, and the *Pail* be pressed downe with him. Note that a Man must kneele or sit, that he may be lower than the *Water*. A Man would thinke, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith; That *Hercules Page Hylas* went with a *Water-pot*, to fill it at a pleasant *Fountaine*, that was neere the *Shore*, and that the *Nymphs* of the *Fountaine* fell in loue with the *Boy*, and pulled him vnder *Water*, keeping him alive; And that *Hercules* missing his *Page*, called him by his Name, aloud, that all the *Shore* rang of it; And that *Hylas* from within the *Water*, answered his Master; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had beene three miles off, when the *Fountaine* (indeed) was fast by.

156

In *Lutes*, and *Instruments* of *Strings*, if you stop a *String* high, (whereby it hath lesse *Scope* to tremble) the *Sound* is more *Treble*, but yet more dead.

157

Take two *Sawcers*, and strike the Edge of the one against the Bottom of the other, within a *Pail* of *Water*; And you shall finde, that as you put the *Sawcers* lower, and lower, the *Sound* groweth more flat; euen while Part of the *Sawcer* is aboue the *Water*; But that Flatnesse of *Sound* is ioyned with a Harshnesse of *Sound*; which (no doubt) is caused by the Inequalitye of the *Sound*, which commeth from the Part of the *Sawcer* vnder the *Water*, and from the Part aboue. But when the *Sawcer* is wholly vnder the *Water*, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from a farre off.

158

A *Soft Body* dampeth the *Sound*, much more than a *Hard*; As if a *Bell* hath *Cloth*, or *Silke* wrapped about it, it deadeth the *Sound* more, than if it were *Wood*. And therefore in *Clavicalls*, the *Keyes* are lined; And in *Colledges* they vse to line the *Tablemen*.

159

Triall was made in a *Recorder*, after these seuerall manners. The Bottom of it was set against the *Palme* of the *Hand*; stopped with *Wax* round about; set against a *Damaske Cushion*; Thrust into *Sand*; Into *Ashes*; Into *Water*, (halfe an Inch vnder the *Water*) Close to the Bottom of a *Silver Basin*; And still the *Tone* remained: But the Bottom of it was set against a *Woollen Carpet*; A *Lining* of *Plush*; A *Locke* of *Wooll*, (though loosely put in;) Against *Snow*; And the *Sound* of it was quite dead, and but *Breath*.

160

Iron Hot produceth not so full a *Sound*, as when it is *Cold*; For while it is hot, it appeareth to be more *Soft*, and lesse *Resounding*. So likewise *Warm Water*; when it falleth, maketh not so full a *Sound*, as *Cold*: And I conceiue it is softer, and neerer the Nature of *Oyle*; For it is more slippery; As may be perceiued, in that it scowreth better.

161

Let there be a *Recorder* made, with two *Fipples*, at each end one; The

Trunke

Truncke of it of the length of two *Recorders*, and the Holes answerable toward each end; And let two play the same Lesson vpon it, at an *Vnison*; And let it be noted, whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two *Trunckes* (thorow-out) hollow; And let two speake, or sing, the one long-waies, the other traaverse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also giue light to the *Mixture of Sounds*; wherof we shall speake hereafter.

A *Bellows* blowne in at the *Hole* of a *Drum*, and the *Drum* then stricken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindreth the Issue of the *Sound*; And partly for that it maketh the *Aire*, being blowne together, lesse moucable.

The *Loudnesse*, and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exility* of *Sounds*; For a *Base String*, though softly stricken, giueth the greater *Sound*; But a *Treble String*, if hard stricken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more *Aire*; And the *Treble* lesse *Aire*, but with a sharper *Percussion*.

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a *Horne* stronger or weaker; Ringing of a *Hand-bell* harder or softer, &c. And the *Strength* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a *Cloth*, it will giue a lesse *Sound*; If against *Wood*, a greater; If against *Metall*, yet a greater; And in *Metals*, if you strike against *Gold*, (which is the more pliant,) it giueth the flatter *Sound*; If against *Siluer*, or *Brasse*, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore we see in discharging of a *Peece*, what a great *Noise* it maketh. We see also, that the *Charge* with *Bullet*; Or with *Paper* wet, and hard stopped; Or with *Powder* alone, rammed in hard; maketh no great difference in the *Loudnesse* of the *Report*.

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *Strength*: As in a *Whip*, or *Wand*, if you strike the *Aire* with it; the Sharper and Quicker you strike it, the *Louder Sound* it giueth. And in playing vpon the *Lute*, or *Virginalls*, the quicke *Stroke* or *Touch*, is a great life to the *Sound*. The *Cause* is, for that the Quicke *Striking* cutteth the *Aire* speedily; whereas the *Soft Striking* doth rather beat, than cut.

The *Communication* of *Sounds* (as in *Bellies* of *Lutes*, *Empty Vessells*, &c.) hath beene touched obiter, in the *Maioration* of *Sounds*: But it is fit also to make a *Title* of it apart.

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162

Experiments
in Consort
touching the
Loudnesse or
Softnesse of
Sounds; and
their Carriage
at longer or shorter
Distance.

163

164

165

Experiments
in Consort
touching the
Communication
of *Sounds*.

166

The *Experiment* for greatest Demonstration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you strike with a Hammer vpon the Vpper Part, and then vpon the Midst, and then vpon the Lower, you shall finde the *Sound* to be more Treble, and more Base, according vnto the Concaue, on the Inside; though the Percussion be onely on the Outside.

167

When the *Sound* is created betweene the *Blast* of the *Mouth*, and the *Aire* of the *Pipe*, it hath neuerthelesse some *Communication* with the Matter of the Sides of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe*, or *Trumpet*, of Wood, and Brasse, the *Sound* will be diuers; So if the *Pipe* be covered with *Cloth*, or *Silke*, it will giue a diuers *Sound*, from that it would doe of it selfe; So, if the *Pipe* be a little wet on the Inside, it will make a differing *Sound*, from the same *Pipe* dry.

168

That *Sound* made within *Water*, doth communicate better with a hard Body thorow *Water*, than made in *Aire*, it doth with *Aire*; Vide *Experimentum*, 134.

Experiments
in Consort touching
Equality,
and Inequality
of Sounds.

We haue spoken before (in the *Inquisition* touching *Musicke*,) of *Musicall Sounds*, wherunto there may be a Concord or Discord in two Parts; Which *Sounds* we call *Tones*. And likewise of *Inmusical Sounds*; And haue giuen the Cause, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*. And we haue also expressed there, what are the *Equall Bodies* that giue *Tones*, and what are the *Vnequall* that giue none. But now we shall speake of such *Inequality* of *Sounds*, as proceedeth, not from the Nature of the Bodies themselues, but is Accidentall; Either from the *Roughnesse*, or *Obliquity* of the *Passage*; Or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169

A *Bell*, if it haue a *Rift* in it, whereby the *Sound* hath not a cleare Passage, giueth a *Hoarse* and *Iarring Sound*; So the *Voice* of *Man*, when by Cold taken the *Wefill* groweth rugged, and (as we call it) furred, becommeth hoarse. And in these two *Instances*, the *Sounds* are Ingrate; because they are meerely *Vnequall*: But, if they be *Vnequall* in *Equality*, then the *Sound* is Gratefull, but Purling.

170

All *Instruments*, that haue either *Returns*, as *Trumpets*; Or *Flexions*, as *Cornets*; Or are *Drawne up*, and put from, as *Sackbuts*; haue a *Purling Sound*: But the *Recorder*, or *Flute*, that haue none of these *Inequalities*, giue a cleare *Sound*. Neuerthelesse, the *Recorder* it selfe, or *Pipe* moistened a little in the Inside, soundeth more solemnly, and with a little Purling, or Hissing. Againe, a *Wreathed String*, such as are in the Base Strings of *Bandoraes*, giueth also a *Purling Sound*.

171

But a *Lute-string*, if it be meerely *Vnequall* in his Parts, giueth a Harsh and

and Vntuneable *Sound*; which *Strings* we call *False*, being bigger in one Place than in another; And therefore *Wire-strings* are neuer *False*. We see also, that when we try a *False Lute-string*, wee vse to extend it hard betweene the fingers, and to fillip it; And if it giueth a double *Species*, it is *True*; But if it giueth a treble, or more, it is *False*.

Waters, in the *Noise* they make as they runne, represent to the Eare a *Trembling Noise*; And in *Regalls*, (where they haue a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall Trembling: And Children haue also little Things they call *Cockes*, which haue *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling* of *Water*, hath an affinity with the Letter *L*. All which *Inequalities* of *Trepidation*, are rather pleasant, than otherwise.

All *Base Notes*, or very *Treble Notes*, giue an *Asper Sound*; For that the *Base* striketh more *Aire*, than it can well strike equally: And the *Treble* cutteth the *Aire* so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane*, or *Tenor*, is the sweetest Part.

We know Nothing, that can at pleasure make a *Musical*, or *Immusical Sound*, by voluntary *Motion*, but the *Voice* of *Man*, and *Birds*. The *Cause* is, (no doubt) in the *Weasill* or *Wind-pipe*, (which we call *Aspera Arteria*;) which being well extended, gathereth *Equality*; As a *Bladder* that is wrinckled, if it be extended, becommeth smooth. The *Extension* is alwaies more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can neuer a giue *Tone*: And in *Singing*, there is (manifestly) a greater *Working* and *Labour* of the *Throat*, than in *Speaking*; As appeareth in the *Thrusting* out, or *Drawing* in of the *Chinne*, when we sing.

The *Humming* of *Bees*, is an *Unequall Buzzing*; And is conceiued, by some of the *Ancients*, not to come forth at their *Mouth*, but to be an *Inward Sound*; But (it may be) it is neither; But from the motion of their *Wings*; For it is not heard but when they stirre.

All *Metalls quenched* in *Water*, giue a *Sibilation* or *Hissing Sound*; (which hath an *Affinity* with the letter *Z*;) notwithstanding the *Sound* be created betweene the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there be but small *Store* of *Water*, in a *Vessell*, giueth a *Hissing Sound*; But *Boyling* in a full *Vessell*, giueth a *Bubling Sound*, drawing somewhat neare to the *Cocks* vsed by *Children*.

Triall would be made, whether the *Inequality*, or *Interchange* of the *Medium*, will not produce an *Inequality* of *Sound*; As if three *Bells* were made one within another, and *Aire* betwixt Each; And then the outermost *Bell* were chimed with a *Hammer*, how the *Sound* would differ from a *Simple Bell*. So likewise take a *Plate* of *Brasse*, and a *Plancke* of *Wood*, and ioyn them close together, and knock vpon one of them, and see if they doe not giue an *unequall Sound*. So make two or three *Partitions* of *Wood* in a *Hoghead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hoghead*, without such *Partitions*.

172

173

174

175

176

177

Experiments
in Consort,
touching the
more Treble, and
the more Base
Tones, or Musi-
call Sounds.

178

It is evident, that the *Percussion* of the *Greater Quantity of Aire*, causeth the *Baser Sound*; And the *lesse Quantity*, the more *Treble Sound*. The *Percussion* of the *Greater Quantity of Aire*, is produced by the *Greatnesse of the Body Percussing*; By the *Latitude* of the *Concave*, by which the *Sound* passeth; and by the *Longitude* of the same *Concave*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the *Note Holes* be, and the further off from the *Mouth* of the *Pipe*, the more *Base Sound* they yeeld; And the nearer the *Mouth*, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the *Top*, it maketh a more *Treble Sound*; And at the *Bottom* a *Baser*.

179

It is also evident, that the *Sharper* or *Quicker Percussion of Aire* causeth the more *Treble Sound*; And the *Slower* or *Heavier*, the more *Base Sound*. So we see in *Strings*; the more they are wound vp, and strained; (And thereby giue a more quicke *Start-backe*;) the more *Treble* is the *Sound*; And the flacker they are, or lesse wound vp, the *Baser* is the *Sound*. And therefore a *Bigger String* more strained, and a *Lesser String*, lesse strained, may fall into the same *Tone*.

180

Children, Women, Eunuchs haue more small and shrill *Voices*, than *Men*. The Reason is, not for that *Men* haue greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) But from the *Dilatation* of the *Organ*; which (it is true) is likewise caused by Heat. But the Cause of *Changing* the *Voice*, at the yeares of *Puberty*, is more obscure. It seemeth to be, for that when much of the *Moisture* of the *Body*, which did before irrigate the *Parts*, is drawne downe to the *Spermatieall vessells*; it leaueth the *Body* more hot than it was; whence commeth the *Dilatation* of the *Pipes*: For we see plainly, all Effects of Heat, doe then come on; As *Pilosity*, more *Roughnesse* of the *Skinne*, *Hardnesse* of the *Flesh*, &c.

181

The *Industry* of the *Musitian*, hath produced two other *Meanes* of *Straining*, or *Intension* of *Strings*, besides their *Winding up*. The one is the *Stopping* of the *String* with the *Finger*; As in the *Necks* of *Lutes*, *Viols*, &c. The other is the *Shortnesse* of the *String*; As in *Harps*, *Virginalls*, &c. Both these haue one, and the same reason; For they cause the *String* to giue a quicker *Start*.

182

In the *Straining* of a *String*, the further it is strained, the lesse *Superstraining* goeth to a *Note*; For it requireth good *Winding* of a *String*, before it will make any *Note* at all: And in the *Stops* of *Lutes*, &c. the higher they goe, the lesse *Distance* is betweene the *Frets*.

183

If you fill a *Drinking-Glasse* with *Water*, (especially one *Sharp* below, and *Wide* above,) and fillip vpon the *Brim*, or *Outside*; And after empty Part of the *Water*, and so more and more, and still try the *Tone* by *Filipping*; you shall finde the *Tone* fall, and be more *Base*, as the *Glasse* is more *Empty*.

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The Iust and Measured *Proportion* of the *Aire Percussed*, towards the *Basenesse* or *Treblenesse* of *Tones*, is one of the greatest *Secrets* in the *Contemplation* of *Sounds*. For it discovereth the true *Coincidence* of *Tones* into *Diapasons*; Which is the *Returne* of the same *Sound*. And so of the *Concords* and *Discords*, betwene the *Unison*, and *Diapason*; Which we haue touched before, in the *Experiments* of *Musicke*; but thinke fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may be found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Distance* of *Frets*; And in the *Proportion* of the *Concaue* of *Pipes*, &c. But most commodiously in the last of these.

Try therefore the *Winding* of a *String* once about, as soone as it is brought to that *Extension*, as will giue a *Tone*; And then of twice about; And thrice about, &c. And marke the *Scale* or *Difference* of the *Rise* of the *Tone*: Wherby you shall discover, in one, two *Effects*; Both the *Proportion* of the *Sound* towards the *Dimension* of the *Winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained. But note that to measure this, the way will be, to take the *Length* in a right *Line* of the *String*, vpon any *Winding* about of the *Pegge*.

As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first *Stop* of the *String*, vnto such a *Stop* as shall produce a *Diapason* to the former *Stop*, vpon the same *String*.

But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments*: And therefore cause some halfe dozen *Pipes*, to be made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so marke what *Fall* of *Tone* euery one giueth. But still in these three last *Instances*, you must diligently obserue, what *length* of *String*, or *Distance* of *Stop*, or *Concaue* of *Aire*, maketh what *Rise* of *Sound*. As in the last of these (which (as we said) is that, which giueth the aptest demonstration,) you must set downe what *Encrease* of *Concaue* goeth to the Making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And so vp to the *Diapason*: For then the great *Secret* of *Numbers*, and *Proportions*, will appeare. It is not vnlike, that those that make *Records*, &c. know this already: for that they make them in *Sets*. And likewise *Bell-founders* in fitting the tune of their *Bells*. So that Enquiry may saue *Triall*. Surely, it hath beene obserued by one of the *Ancients*, that an *Empty Barrell* knocked vpon with the finger, giueth a *Diapason* to the *Sound* of the like *Barrell full*; But how that should be, I doe not well vnderstand; For that the knocking of a *Barrell full*, or *Empty*, doth scarce giue any *Tone*.

Experiments
in Confort
touching the
Proportion of
Treble and Base
Tones.

184

185

186

187

There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the *Passive*: And that it be not too neare, but at a distance. For in a *Recorder*, the three vppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the *Winding* or *Stopping* of *Strings*.

Experiments
in Confort
touching Exte-
riour, and Inte-
riour Sounds.

There is another Difference of *Sounds*, which we will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musical*, nor *Immusical*: Though it be true, that there can be no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may be both *Musical* and *Immusical*. We shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that we meane) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

188

In *Speech* of *Man*, the *Whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can neuer make a *Tone*, nor sing in *Whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowes*, or *Wind*, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concane*, (though soft) is an *Exteriour*. So likewise, the greatest *Winds*, if they haue no *Coarctation*, or blow not hollow, giue an *Interiour Sound*; The *Whistling* or hollow *Wind* yeeldeth a *Singing*, or *Exteriour Sound*; The former being pent by some other *Body*; The latter being pent in by his owne *Density*: And therefore we see, that when the *Wind* bloweth hollow, it is a *Signe* of *Raine*. The *Flame*, as it moueth within it selfe, or is blowne by a *Bellowes*, giueth a *Murmur* or *Interiour Sound*.

189

There is no *Hard Body*, but stricke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: In so much as if the *Percussion* be ouer-soft, it may induce a *Nullity* of *Sound*; But neuer an *Interiour Sound*; As when one treadeth so softly, that he is not heard.

190

Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it neuer giueth an *Exteriour Sound*; As if you blow strongly with a *Bellowes* against a *Wall*.

191

Sounds (both *Exteriour* and *Interiour*,) may be made, as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

Experiments
in Confort,
touching Arti-
culation of
Sounds.

It is euident, and it is one of the strangest *Secrets* in *Sounds*, that the *whole Sound* is not in the *whole Aire* onely; But the *whole Sound* is also in euery small *Part* of the *Aire*. So that all the curious *Diuerfity* of *Articulate*

192

culat Sounds, of the Voice of Man, or Birds, will enter at a small Cranny, Inconfused.

The *Unequall Agitation* of the *Winds*, and the like, though they bee materiall to the Carriage of the *Sounds*, further, or lesse way; yet they doe not confound the *Articulation* of them at all, within that distance that they can be heard; Though it may be, they make them to be heard lesse Way, than in a Still; as hath beene partly touched.

Ouer-great Distance confoundeth the *Articulation* of *Sounds*. As we see, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot distinguish what he saith. And one *Articulate Sound* will confound another; As when many speake at once.

In the *Experiment* of *Speaking under Water*, when the Voice is reduced to such an Extreme Exility, yet the *Articulate Sounds*, (which are the *Words*,) are not confounded; as hath beene said.

I conceiue, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Dispersing*: And although (as was formerly said) a *Sound Articulate*, already created, will be contracted into a small Cranny; yet the first *Articulation* requireth more Dimension.

It hath beene obserued, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewise in the Roofe, a Preacher cannot be heard so well, as in the like Places not so Vaulted. The Cause is, for that the *Subsequent Words* come on, before the *Precedent words* vanish: And therefore the *Articulate Sounds* are more confused, though the Groesse of the *Sound* be greater.

The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the seuerall *Alphabetical Letters*, are worthy Enquiry, and pertinent to the present *Inquisition* of *Sounds*: But because they are subtill, and long to describe, we will refer them ouer, and place them amongst the *Experiments* of *Speech*. The *Hebrewes* haue beene diligent in it, and haue assigned, which *Letters* are *Labiall*, which *Dental*, which *Gutturall*, &c. As for the *Latines*, and *Grecians*, they haue distinguished betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Mute Tenues*, *Media*, and *Aspirate*; Not amisse; But yet not diligently enough. For the speciall *Strokes*, & *Motions*, that create those *Sounds*, they haue little enquired: As that the *Letters*, *B. P. F. M.* are not expressed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters N. and B.* cannot be pronounced, but that the *Letter N.* will turne into *M.* As *Hecatonba*, will be *Hecatomba*. That *M. and T.* cannot be pronounced together, but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the *Making* of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

The *Lungs* are the most Spongy Part of the Body; And therefore ablest to contract, and dilate it selfe: And where it contracteth it selfe, it

193

194

195

196

197

198

199

it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Palate*, and the rest of those they call *Instruments of voice*.

300

There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that haue no *Voice Articulate*; and diuers *Letters of Articulate Voices*: And commonly Men haue giuen such Names to those *Sounds*, as doe allude vnto the *Articulate Letters*. As *Trembling of Water* hath Resemblance with the *Letter L*; *Quenching of Hot Mettalls*, with the *Letter Z*; *Snarling of Dogs*, with the *Letter R*; The *Noise of Scritchowles*, with the *Letter Sh*; *Voice of Cats*, with the *Dyphthong En*; *Voice of Cuckoes*, with the *Dyphthong On*; *Sounds of Strings*, with the *Letter Ng*: So that if a Man, (for Curiosity, or Strangenesse sake,) would make a *Puppet*, or other *Dead Body*, to pronounce a *Word*; Let him consider, on the one Part, the Motion of the *Instruments of Voice*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformity there is that causeth the Similitude of *Sounds*; And by that he may minister light to that Effect.

NATV-

NATVRALL HISTORIE.

III. Century.



ALL *Sounds* (whatsoever) moue Round; That is to say; On all *Sides*; *Vpwards*; *Downwards*; *Forwards*; and *Backwards*. This appeareth in all *Instances*.

Sounds doe not require to bee conueyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but may be *Arch*ed; Though it be true, they moue strongest in a *Right Line*; Which neuerthelesse is not caused by the *Rightnesse* of the *Line*, but by the *Shortnesse* of the distance; *Linea recta breuissima*. And therefore we see, if a *Wall* be betweene, and you speake on the one *Side*, you heare it on the other; Which is not because the *Sound* Passeth thorow the *Wall*; but *Archeth* ouer the *Wall*.

If the *Sound* be *Stopped* and *Repercussed*, it commeth about on the other *Side*, in an *Oblique Line*. So, if in a *Coach*, one side of the *Boot* be downe, and the other yp; And a *Begger* beg on the *Close Side*; you would thinke that he were on the *Open Side*. So likewise, if a *Bell* or *Clocke*, be (for Example) on the *North-side* of a *Chamber*; And the *Window* of that *Chamber* be vpon the *South*; He that is in the *Chamber*, will thinke the *Sound* came from the *South*.

Sounds, though they spread round, (so that there is an *Orbe*, or *Spherical Area* of the *Sound*;) yet they moue strongest, and goe furthest in the *Fore-lines*, from the first *Locall Impulsion* of the *Aire*. And therefore in *Preaching*, you shall heare the *Preachers* Voice, better, before the *Pulpit*, than behinde it, or on the *Sides*, though it stand open. So a *Marquebuz*, or *Ordnance*, will be further heard, forwards, from the *Mouth* of the *Pece*, than backwards, or on the *Sides*.

It may bee doubted, that *Sounds* doe moue better, *Downwards* than

201

Experiments
in Consort,
touching the
Motions of
Sounds, in what
Lines they are
Circular, Ob-
lique, Straight;
Vpwards, down-
wards; For-
wards, Back-
wards.

202

203

204

205

than Vpwards. *Pulpits* are placed high about the People. And when the Ancient *Generalls* spake to their Armies, they had euer a Mount of Turfe cast vp, whereupon they stood: But this may be imputed to the Stops and Obstacles, which the voice meeteth with, when one speaketh vpon the leuell. But there seemeth to be more in it: For it may bee, that *Spiritual Species*, both of *Things Visible* and *Sounds*, doe moue better *Downwards* than *Vpwards*. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of Pauls, seeme much lesse then they are, and cannot bee knowne; But to Men about, those below seeme nothing so much lessened, and may bee knowne: yet it is true, that all things to them about, seeme also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Vpper window, or Tarras.

206

But to make an exact Triall of it, let a Man stand in a *Chamber*, not much about the Ground, and speake out at the window, through a *Trunke*, to one standing on the Ground, as softly as he can, the other laying his Eare close to the *Trunke*: Then *viâ versa*, let the other speake *below* keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Trunck*: And this may be the aptest Meanes, to make a Iudgement, whether *Sounds* descend, or ascend, better.

Experiments
in Cōsort tou-
ching the Last-
ing and Peri-
sing of Sounds;
And touching
the Time they
require to
their Generati-
on, or Delation.

207

After that *Sound* is created, (which is in a moment,) wee finde it continueth some small time, melting by little and little. In this there is a wonderfull Error amongst Men, who take this to be a *Continuance* of the First *Sound*; whereas (in truth) it is a *Renouation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String stricken, which is thought to be a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a Virginall, as soone as euer the Iacke falleth, and toucheth the String, the *Sound* ceaseth; And in a Bell, after you haue chimed vpon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish, that there are two *Trepidations*: The one Manifest, and Locall; As of the Bell, when it is Pensile: The other Secret, of the Minute Parts; such as is described in the 9th Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while, after you haue plaied; But that is but while the Bellows are in Falling.

208

It is certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will be carried, (at the least) twenty Miles vpon the land, and much further vpon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs be a *Continuance* of the First *Sound*; For there is no *Trepidation* which should renew it. And the

the Touching of the *Ordinance* would not extinguish the *Sound* the sooner : So that in great *Sounds* the *Continuance* is more than Momentany.

To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and haue with him a Taper ; And let some Vaile be put before the Taper ; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell ; And in the same Instant withdraw the Vaile ; And so let him in the Field tell by his Pulse what distance of *Time* there is, betweene the *Light scene*, and the *Sound heard* : For it is certaine that the *Delation* of Light is in an Instant. This may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

It is generally knowne and obserued, that *Light*, and the *Object* of *Sight*, moue swifter than *Sound* ; For we see the *Flash* of a Peece is seene sooner, than the *Noise* is heard. And in Hewing wood, if one be some distance off, he shall see the Arme lifted vp for a second Stroke, before he heare the *Noise* of the first. And the greater the Distance, the greater is the Preuention : As we see in Thunder, which is farre off ; where the *Lightning* Precedeth the *Crack* a good space.

Colours, when they represent themselves to the Eye, fade not, nor melt not by Degrees, but appeare still in the same Strength ; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Aire* ; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire*, (as a Cause *Sine qua non*.) in that, it perisheth so suddenly ; For in euery Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe ; which the *Water* also doth, but nothing so swiftly.

In the Trialls of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing By the Sides* of a Body, for the *Passing thorow* a Body : And therefore you must make the *Intercepting Body* very close ; For *Sound* will passe thorow a small Chincke.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water* ; thorow a *Wall* ; thorow *Metall*, as in Hawkes Bells stopped ; &c.) the *Hard*, or *Close Body*, must be but thinne and small ; For else it deadeth and extinguisheth the *Sound* vtterly. And therefore, in the *Experiment* of *Speaking in Aire vnder Water*, the Voice must not be very deepe within the *Water* : For then the *Sound* pierceth not. So if you speake on the further side of a *Close Wall*, if the *Wall* be very thicke, you shall not be heard : And if there were an Hoghead empty, whereof the Sides were some two Foot thicke, and the Bunghole stopped ; I conceiue the *Resounding Sound*, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none ; But onely you shall heare the *Noise* of the Outward Knocke, as if the Vessell were full.

Experiments
in Consort,
touching the
Passage and In-
terceptions of
Sounds.

212

213

214

213

It is certaine, that in the *Passage* of *Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are stricke, than when the Percussion is onely within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped vp, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell giue any *Sound* at all, or how weake? But note, that you must in stead of the Threed, take a Wire; Or else let the Glasse haue a great Belly; lest when you shake the Bell, it dash vpon the Sides of the Glasse.

214

It is plaine, that a very *Long*, and *Downe-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard ouer a wall, will not be heard ouer a Church; Nor that *Sound*, which will be heard, if you stand some distance from the wall, will be heard if you stand close vnder the Wall.

215

Soft and *Foraminous Bodies*, in the first *Creation* of the *Sound*, will dead it; For the Striking against Cloth, or Furre, will make little *Sound*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As we see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windowes, if they be very Close, will checke a *Sound* more, than the like Thicknesse of Cloth. Wee see also, in the Rumbling of the Belly, how easily the *Sound* passeth thorow the Guts, and Skin.

216

It is worthy the Enquiry, whether *Great Sounds*, (As of Ordnance, or Bells,) become not more *Weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds*, (it may be,) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps,) not so well.

Experiments
in Cōfort tou-
ching the Me-
dium of Sounds.

217

The *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *Water*. And *Hard Bodies* refuse not altogether to be *Mediums* of *Sounds*. But all of them are dull and vnapt *Deferents*, except the *Aire*.

218

In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Evening Sounds*; And *Sounds* in moist Weather, and Southerne Winds. The reason is already mentioned in the Title of *Maioration* of *Sounds*; Being for that *Thinne Aire* is better pierced; but *Thicke Aire* preserueth the *Sound* better from Wast; Let further Triall be made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *Sound*.

219

How farre forth *Flame* may be a *Medium* of *Sounds*, (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a Bonfire is betweene; But then you must allow, for some disturbance, the *Noise* that the *Flame* it selfe maketh.

220

Whether any other *Liquours*, being made *Mediums*, cause a Diuersity of *Sound* from *Water*, it may be tried: As by the Knapping of the Tongs; Or Striking of the Bottome of a vessell, filled either with Milke,

or

or with Oyle ; which though they be more light, yet are they more vn-equall Bodies than Aire.

Of the Natures of the Mediums, we haue now spoken ; As for the Disposition of the said Mediums, it doth consist in the Penning, or not Penning of the Aire ; Of which we haue spoken before, in the Title of Delation of Sounds : It consisteth also in the Figure of the Concaue, through which it passeth ; Of which we will speake next.

How the *Figures* of Pipes, or Concaues, through which Sounds passe ; Or of other Bodies deferent ; conduce to the Varietie and Alteration of the Sounds ; Either in respect of the Greater Quantitie, or lesse Quantitie of Aire, which the Concaues receiue ; Or in respect of the Carrying of Sounds longer or shorter way ; Or in respect of many other Circumstances ; they haue beene touched, as falling into other Titles. But those *Figures*, which we now are to speake of, wee intend to be, as they concerne the Lines, through which Sound passeth ; As *Straight ; Crooked ; Angular ; Circular ; &c.*

The *Figure* of a Bell pertaketh of the *Pyramis*, but yet comming off, and dilating more suddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique ; yet they haue likewise *Straight Hornes* ; which if they be of the same Bore with the *Oblique*, differ little in Sound ; Saue that the *Straight* require somewhat a stronger Blast. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are straight ; But the *Recorder* hath a lesse Bore, and a greater ; Aboue, and below. The *Trumpet* hath the *Figure* of the Letter *S* : which maketh that Purling Sound, &c. Generally, the *Straight Line* hath the cleaneft and roundest Sound, And the *Crooked* the more Hoarse, and Iarring.

Of a *Sinuous Pipe*, that may haue some foure Flexions, Triall would be made. Likewise of a *Pipe*, made like a *Crosse*, open in the middest. And so likewise of an *Angular Pipe* : And see what will be the Effects of these seuerall Sounds. And so againe of a *Circular Pipe* ; As if you take a *Pipe* perfect Round, and make a Hole whereinto you shall blow ; And another Hole not farre from that ; But with a Trauerse or Stop betweene them ; So that your Breath may goe the Round of the Circle, and come forth at the second Hole. You may trie likewise *Percussions* of Solide Bodies of seuerall *Figures* ; As *Globes*, *Flats*, *Cubes*, *Crosses*, *Triangles*, &c. And their *Combinations* ; As *Flat* against *Flat* ; And *Conuex* against *Conuex* ; And *Conuex* against *Flat*, &c. And marke well the diuersities of the Sounds. Trie also the difference in Sound of seuerall *Crafsitudes* of Hard Bodies percussed ; And take knowledge of the diuersities of the Sounds. I my selfe haue tried, that a Bell of Gold yeeldeth an excellent Sound, nor inferiour to that of *Siluer*, or *Brasse*, but rather better : yet wee see that a

Experiments
in Consort,
what the Fi-
gures of the
Pipes, or Con-
caues, or the
Bodies Deferent
conduce to the
Sounds.

221

222

peece of Money of Gold soundeth farre more flat than a peece of Money of Silver.

223

The Harpe hath the *Concaue*, not along the *Strings*, but acrosse the *Strings*; And no *Instrument* hath the *Sound* so Melting, and Prolonged, as the *Irish Harpe*. So as I suppose, that if a *Virginal* were made with a double *Concaue*; the one all the length as the *Virginal* hath; the other at the End of the *Strings*, as the *Harpe* hath; It must needs make the *Sound* perfecter, and not so Shallow, and Iarring. You may trie it, without any *Sound Board* along, but only *Harpe-wise*, at one End of the *Strings*: Or lastly with a double *Concaue*, at Each end of the *Strings* one.

Experiments
in Confort
touching the
Mixture of
Sounds.

224

There is an apparent Diuersitie betweene the *Species Visible*, and *Audible*, in this; That the *Visible* doth not mingle in the *Medium*, but the *Audible* doth. For if wee looke abroad, wee see Heauen, a number of Stars, Trees, Hills, Men, Beasts, at once. And the *Species* of the one doth not confound the other. But if so many *Sounds* came from severall Parts, one of them would vtterly confound the other. So wee see, that *Voices* or *Consorts* of *Musicke* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true neuerthelesse, that a great *Light* drowneth a smaller, that it cannot be seene; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a lesser. And I suppose likewise, that if there were two *Lanthornes* of *Glasse*, the one a *Crimsin*, and the other an *Azure*, and a *Candle* within either of them, those *Coloured Lights* would mingle; and cast vpon a *White Paper* a *Purple Colour*. And euen in *Colours*, they yeeld a faint and weake *Mixture*: For white walls make *Roomes* more lightsome than blacke, &c. But the Cause of the *Confusion* in *Sounds*, and the *Inconfusion* in *Species Visible*, is, For that the *Sight* worketh in *Right Lines*, and maketh severall *Cones*; And so there can be no *Coincidence* in the *Eye*, or *Visuall Point*: But *Sounds*, that moue in *Oblique* and *Arcuate Lines*, must needs encounter, and disturbe the one the other.

225

The sweetest and best *Harmony* is, when euery *Part*, or *Instrument*, is not heard by it selfe, but a *Conflation* of them all; Which requireth to stand some distance off. Euen as it is in the *Mixture* of *Perfumes*; Or the Taking of the *Smells* of severall *Flowers* in the *Aire*.

226

The *Disposition* of the *Aire*, in other *Qualities*, except it be ioyned with *Sound*, hath no great Operation vpon *Sounds*: For whether the *Aire* be lightsome or darke, hot or cold, quiet or stirring, (except it be with *Noise*) sweet-smelling, or stinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

227

But *Sounds* doe disturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one Iarring and discording with the other, and making a *Confusion*; Sometimes the one Mingling and Compounding with the other, and making an *Harmony*.

228

Two *Voices* of like lowdnesse, will not be heard, twice as farre, as one of

of them alone; And two *Candles* of like light, will not make Things seene twice as farre off, as one. The Cause is profound; But it seemeth that the *Impressions* from the *Objects* of the *Senses*, doe *mingle* respectiue-ly, euery one with his kinde; But not in proportion, as is before demon- strated: And the reason may be, because the first *Impression*, which is from *Prinative* to *Active*, (As from *Silence* to *Noise*, or from *Darknesse* to *Light*,) is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse Light*, to *More Light*. And the Reason of that againe may be; For that the *Aire*, after it hath receiued a Charge, doth not receiue a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of Vertue, generally, what Proportion it beareth to the Encrease of the Matter, it is a large Field, and to be hand- led by it selfe.

All *Reflexions Concurrent* doe make *Sounds* Greater; But if the Body that createth, either, the Originall *Sound*, or the *Reflexion*, be cleane and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the Belly of polished Brasse, in stead of Wood. We see that euen in the Open *Aire*, the *Wire String* is sweeter, than the *String* of *Guts*. And we see that for *Reflexion*, *Water* excelleth; As in *Musick* neare the *Water*; Or in *Eccho's*.

Experiments
in Consort
touching Me-
lioration of
Sounds.

229

It hath beene tried, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more solemne *Sound*, than if the *Pipe* were dry: But yet with a sweet Degree of *Sibilation*, or *Purling*; As we touched it before in the title of *Equality*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) betweene dry and wet, become a little more Euen and Smooth; But the *Purling*, (which must needs proceed of Inequality,) I take to be bred betweene the Smoothnesse of the inward Surface of the *Pipe*, which is wet; And the Rest of the Wood of the *Pipe*, vnto which the Wet commeth not, but it remaineth dry.

230

In *Frosty weather*, *Musicke* within doores soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the *Wood* or *String* of the *Instrument*, which is made more Crispe, and so more porous and hollow: And we see that *Old Lutes* sound better than *New*, for the same reason. And so doe *Lute-Strings* that haue beene kept long.

231

Sound is likewise *Meliorated* by the *Mingling* of open *Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot ouer the Strings; yet so, as there be Roome enough for the Strings, and Roome enough to play be- low that Belly. Triall may be made also of an *Irish Harpe*, with a Con- caue on both Sides; Whereas it vseth to haue it but on one Side. The doubt may be, lest it should make too much Resounding; wherby one Note would ouertake another.

232

If you sing into the Hole of a *Drum*, it maketh the *Singing* more sweet.

233

sweet. And so I conceiue it would, if it were a *Song* in Parts, sung into seuerall *Drums*; And for handfornesse and strangeness sake, it would not be amisse to haue a Curtaine betweene the Place where the *Drums* are, and the *Hearers*.

234

When a *Sound* is created in a *Wind-Instrument*, betweene the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a *Trumpet*, or *Pipe of Wood*; And againe in a *Trumpet* or *Pipe of Brasse*. It were good to try *Recorders* and *Hunters Hornes* of *Brasse*, what the *Sound* would be.

235

Sounds are *meliorated* by the *Intension* of the *Sense*; where the *Common Sense* is collected most, to the *particular Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blinde Men, than to Others: And it is manifest, that betweene *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musicke* is farre sweeter, than when one is *fully Waking*.

Experiments
in Cōfort tou-
ching the Imit-
ation of Sounds.

236

It is a Thing strange in Nature, when it is attentiuely considered; How *Children*, and some *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds of Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many Essayes and Proffers: But all this dischargeth not the Wonder. It would make a Man thinke (though this which we shall say may seeme exceeding strange) that there is some *Transmission* of *Spirits*; and that the *Spirits* of the *Teacher* put in Motion, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest Secrets in Nature,) we shall speake in due place; Chiefly when we come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a predisposition to *Imitate*. We see how ready Apes and Monkeys are, to *imitate* all *Motions* of Man: And in the Catching of Dottrells, we see, how the Foolish Bird playeth the Ape in Gestures: And no Man (in effect) doth accompany with others, but he learneth, (ere he is aware,) some Gesture, or Voice, or Fashion of the other.

237

In *Imitation of Sounds*, that *Man* should be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like, giuen them for the *Imitation*; And besides, you shall haue Parrots, that will not only *imitate Voices*, but Laughing, Knocking, Squeaking of a Doore vpon the Hinges, or of a Cart-wheele; And (in effect) any other *Noise* they heare.

238

No *Beast* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape
it

it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I haue knowne a Dog, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparison of *Beasts*, to *imitate* the Speech of *Man*, may be further enquired. We see that *Beasts* haue those Parts, which they count the *Instruments* of Speech, (as *Lips, Teeth, &c.*) liker vnto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many *Beasts* haue it, for the Length, as much as *Birds*. What better *Gorge*, or *Artire*, *Birds* haue, may be further enquired. The *Birds* that are knowne to be Speakers, are, *Parrots, Pyes, Iayes, Dawes, and Rauens*. Of which *Parrots* haue an adunque Bill, but the rest not.

But I conceiue, that the *Aptnesse* of *Birds*, is not so much in the *Conformitie* of the *Organs* of Speech, as in their *Attention*. For Speech must come by *Hearing*, and *Learning*; And *Birds* giue more heed, and marke *Sounds*, more than *Beasts*; Because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keepe them Waking, to increase their *Attention*. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are euer the better *Singers*; which may be, because they are more liuely, and listen more.

Labour, and *Intention* to *imitate* voices, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the voices of *Players* of *Enterludes*, so to life, as if you see them not, you would thinke they were those *Players* themselues; And so the *Voices* of other *Men* that they heare.

There haue beene some, that could counterfeit the *Distance* of *Voices*, (which is a *Secondary Object* of *Hearing*,) in such sort; As when they stand fast by you, you would thinke the Speech came from a farre off, in a fearefull manner. How this is done, may be further enquired. But I see no great vse of it, but for *Imposture*, in counterfeiting *Ghosts* or *Spirits*.

There be three Kindes of *Reflexions* of *Sounds*, A *Reflexion* *Concurrent*; A *Reflexion* *Iterant*, which we call *Eccbo*; And a *Super-reflexion*, or an *Eccbo* of an *Eccbo*, wherof the first hath beene handled in the Title of *Magnitude* of *Sounds*: The Latter two we will now speake of.

Experiments
in Consort,
touching the
Reflexion of
Sounds.

The *Reflexion* of *Species Visible*, by *Mirrouers*, you may command; Because passing in Right Lines, they may be guided to any Point: But the *Reflexion* of *Sounds* is hard to master; Because the *Sound* filling great Spaces in *Arched Lines*, cannot be so guided: And therefore we see there hath not beene practised, any Meanes to make *Artificiall Eccbo's*. And no *Eccbo* already knowne returneth in a very narrow Roome.

The *Naturall Eccbo's* are made vpon *Walls, Woods, Rockes, Hills, and Banckes*; As for *Waters*, being neare, they make a *Concurrent Eccbo*; But being

239

240

241

242

243

being further off, (as vpon a large *Riuer*) they make an *Iterant Eccho*: For there is no difference betweene the *Concurrent Eccho*, and the *Iterant*, but the Quicknesse, or Slownesse of the Returne. But there is no doubt, but *Water* doth helpe the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244

It is certaine, (as hath beene formerly touched,) that if you speake thorow a *Truncke*, stopped at the further end, you shall finde a Blast returne vpon your Mouth, but no *Sound* at all. The *Cause* is, for that the *Closenesse*, which preferueth the *Originall*, is not able to preserue the *Reflected Sound*: Besides that *Eccho's* are seldom created, but by loud *Sounds*. And therefore there is lesse hope of *Artificiall Eccho's* in *Aire*, pent in a narrow *Concaue*. Neuerthelesse it hath beene tried, that One leaning ouer a *Well*, of 25. Fathome deepe, and speaking, though but softly, (yet not so soft as a whisper,) the *Water* returned a good *Audible Eccho*. It would be tried, whether Speaking in *Caves*, where there is no Issue, saue where you speake, will not yeeld *Eccho's*, as *Wells* doe.

245

The *Eccho* commeth as the *Originall Sound* doth, in a Round Orbe of *Aire*: It were good to try the Creating of the *Eccho*, where the Body *Repercussing* maketh an Angle: As against the Returne of a *Vvall*, &c. Also we see that in *Mirrors*, there is the like Angle of Incidence, from the Obiect to the Glasse, and from the Glasse to the Eye. And if you strike a *Ball* side-long, not full vpon the Surface, the Rebound will be as much the contrary way; Whether there be any such *Resilience* in *Eccho's*, (that is, whether a Man shall heare better, if he stand aside the Body *Repercussing*, than if he stand where he speaketh, or any where in a right Line betweene;) may be tried. Triall likewise would be made, by Standing nearer the Place of *Repercussing*, than he that speaketh; And againe by Standing further off, than hee that speaketh; And so Knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not strongest neare hand.

246

There be many Places, where you shall heare a Number of *Eccho's*, one after another: And it is, when there is Variety of *Hills*, or *Woods*, some nearer, some further off: So that the Returne from the further, being last created, will be likewise last heard.

247

As the *Voice* goeth round, as well towards the Backe, as towards the Front of him that speaketh; So likewise doth the *Eccho*; For you haue many *Back-Eccho's* to the Place where you stand.

248

To make an *Eccho*, that will report, three, or foure, or fve Words, distinctly, it is requisite, that the Body *Repercussing*, be a good distance off: For if it be neare, and yet not so neare, as to make a *Concurrent Eccho*, it choppeth with you vpon the sudden. It is requisite likewise, that the *Aire* be not much pent. For *Aire*, at a great distance, pent, worketh the same effect with *Aire*, at large, in a small distance. And therefore in the *Triall* of *Speaking* in the *Well*, though the *Well* was deepe, the *Voice* came backe, suddenly; And would beare the Report but of two Words.

For

For *Eccho's* vpon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or foure Miles from *Paris*, neere a Towne called *Pont-charenton*; And some Bird-bolt shot, or more, from the Riuer of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Isles of *Churches*, also standing; The Roofe all open, not so much as any Embowment neere any of the walls left. There was against euery Pillar, a Stacke of Billets, aboue a Mans Height; which the Watermen, that bring Wood downe the *Seane*, in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it returne the Voice thirteene seuerall times; And I haue heard of others, that it would returne sixteene times: For I was there about three of the Clocke in the Afternoone: And it is best, (as all other *Eccho's* are) in the Euening. It is manifest, that it is not *Eccho's* from seuerall places, but a *Tossing* of the Voice, as a Ball, to and fro; Like to *Reflexions* in *Looking-glasses*; where if you place one *Glasse* before, and another behinde, you shall see the *Glasse* behinde with the *Image*, within the *Glasse* before; And againe, the *Glasse* before in that; and diuers such *Super-Reflexions*, till the *species speciei* at last die. For it is euery Returne weaker, and more shady. In like manner, the *Voice* in that *Chappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and euery *Reflexion* is weaker than the former: So that, if you speake three Words, it will (perhaps) some three times report you the whole three Words; And then the two latter Words for some times; And then the last Word alone for some times; Still fading, and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or fise Words; In this *Eccho* of so many Returnes, vpon the matter, you heare aboue twenty Words, for three.

The like *Eccho* vpon *Eccho*, but only with two Reports, hath beene obserued to be, if you stand betweene a *House*, and a *Hill*, and lure towards the *Hill*. For the *House* will giue a *Backe-Eccho*; One taking it from the other, and the latter the weaker.

250

There are certaine *Letters*, that an *Eccho* will hardly expresse; As *S*, for one; Especially being Principiall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that tooke it to be the Worke of Spirits, and of good Spirits. For, (said he) call *Satan*, and the *Eccho* will not deliuer backe the *Deuils* name; But will say, *Vat'en*; Which is as much in *French*, as *Apage*, or *Auoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hissing and an *Interior Sound*.

251

Eccho's are some more sudden, and chop againe, as soone as the *Voice* is deliuered; As hath beene partly said: Others are more deliberate, that is, giue more Space betweene the *Voice*, and the *Eccho*; which is caused by the locall Nearenesse, or Distance: Some will report a longer Train of Words; And some a shorter: Some more loud (full as loud as the *Originall*,

252

ginall, and sometimes more loud;) And some weaker and fainter.

253

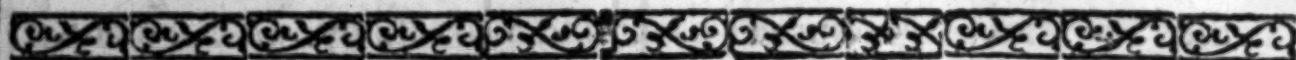
Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*, and so make the Report greater, and even a *Continued Eccho*; which you shall finde in some *Hills*, that stand encompassed, Theater-like.

254

It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe through diuers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliver the *Sound*, in a differing Place, from that vnto which it is deferred; which is the Proper Effect of *Refraction*. But *Maioration*, which is also the Worke of *Refraction*, appeareth plainly in *Sounds*, (as hath beene handled at full;) But it is not by Diuersitie of *Mediums*.

Experiments
in Cōsort tou-
ching the Con-
sent and Dissent
between *Visi-
bles* & *Audibles*.

We haue *obitèr*, for Demonstrations sake, vsed in diuers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But wee thinke good now to prosecute that *Comparison* more fully.



CONSENT OF VISIBLES, and Audibles.

255

Both of them *spread themselves in Round*, and fill a whole Floare or Orbe, vnto certaine Limits: And are carried a great way: And doe languish and lessen by degrees, according to the Distance of the Objects from the Sensories.

256

Both of them haue the whole *Species* in every small Portion of the *Aire*, or *Medium*; So as the *Species* doe passe through small Crannies, without Confusion: As we see ordinarily in *Leuels*, as to the *Eye*; And in *Crannies*, or *Chinks*, as to the *Sound*.

257

Both of them are of a *sudden and easie Generation* and *Delation*; And likewise *perish swiftly*, and *suddenly*; As if you remoue the *Light*; Or touch the *Bodies* that giue the *Sound*.

258

Both of them doe *receiue* and *carry exquisite* and *accurate Differences*; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quauering, in *Audibles*.

259

Both of them in their Vertue and Working, doe not appeare to *emit any Corporall Substance* into their *Mediums*, or the Orbe of their Vertue; Neither againe to raise or stirre any *eident locall Motion* in their *Mediums*, as they passe; But only to carry certaine *Spiritwall Species*; The perfect Knowledge of the Cause whereof, being hitherto scarcely attained, wee shall search and handle in due place.

260

Both of them seeme not to generate or produce any other Effect in Na-
ture,

ture, but such as appertaineth to their proper Obiects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The First, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sunne, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an *Obiect of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent *Sound* (neare the Eare) the Hearing: The Third, in that *both of them will be reuerberate*; As in *Mirrours*; And in *Eccho's*.

Neither of them doth *destroy or hinder the Species of the other*, although they *encounter* in the same *Medium*; As Light or Colour hinder not *Sound*; Nor *contra*.

Both of them *affect the Sense in Living Creatures*, and yeeld *Obiects of Pleasure and Dislike*: Yet neuerthelesse, the *Obiects* of them doe also (if it be well obserued) affect and worke vpon dead Things; Namely, such as haue some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke vpon a *Looking-glasse*, which is like the Pupill of the Eye; And *Audibles* vpon the Places of *Eccho*, which resemble, in some sort, the Cauerne and structure of the Eare.

Both of them doe *diuersly worke*, as they haue their *Medium diuersly disposed*. So a Trembling *Medium* (as Smoake) maketh the Obiect seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall.

To *Both*, the *Medium*, which is the most Propitious and Conducibile, is *Aire*; For *Glasse or Water, &c.* are not comparable.

In *Both* of them, where the *Obiect is Fine and Accurate*, it conduceth much to haue the *Sense Intentione, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentiuely; which in Beasts that haue Eares moueable, is most manifest.

The *Beames of Light*, when they are *multiplied*, and *conglomerate*, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication and Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*; which is an Action materiare, differing from the Action of *Sound*; If it be true (which is anciently reported) that *Birds*, with great shouts, haue fallen downe.

DISSENTS OF VISIBLES, and Audibles.

268 **T**He *Species* of *Visibles* seeme to be *Emissions* of *Beames* from the *Object* scene; Almost like *Odours*; saue that they are more *Incorporeall*: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Percussions* or *Impressions* made vpon the *Aire*. So that whereas all *Bodies* doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *Species* of *Audibles* seeme to be carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceiue) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

270 There is one *Difference*, aboue all others, betweene *Visibles* and *Audibles*, that is the most remarkable; As that wherupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are carried in *Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of *Bodies* doth not much hinder the Sight, so that the *Bodies* be cleare, and the *Pores* in a *Right Line*, as in *Glasse*, *CrySTALL*, *Diamonds*, *Water*, &c. But a thin *Scarfe*, or *Handkerchiefe*, though they be *Bodies* nothing so solide, hinder the Sight: Whereas (contrariwise) these *Porous Bodies* doe not much hinder the Hearing, but solide *Bodies* doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small *Glasses* suffice; but to the *Reuerberation* of *Audibles*, are required greater *Spaces*, as hath likewise beene said before.

271 *Visibles* are scene further off, than *Sounds* are heard; Allowing neuerthelesse the *Rate* of their *Bignesse*: For otherwise a great *Sound* will be heard further off, than a *Small Body* scene.

272 *Visibles* require (generally) some *Distance* betweene the *Object*, and the *Eye*, to bee better scene; Whereas in *Audibles*, the nearer the Approach of the *Sound* is to the *Sense*, the better. But in this there may be a double *Error*. The one, because to *Seeing*, there is required *Light*; And any thing that toucheth the *Pupill* of the *Eye* (all ouer,) excludeth the *Light*. For I haue heard of a *Person* very credible, (who himselfe was cured of a *Cataract* in one of his *Eyes*,) that while the *Siluer Needle* did worke vpon the Sight of his *Eye*, to remoue the *Filme* of the *Cataract*,

raet, he neuer saw any thing more cleare or perfect, than that white Needle: Which (no doubt,) was, because the Needle was lesser than the *Pupill* of the *Eye*, and so tooke not the Light from it. The other Error may be, for that the *Obiect* of *Sight* doth strike vpon the *Pupill* of the *Eye*, directly without any interception; whereas the *Cane* of the *Eare* doth hold off the *Sound* a little from the Organ: And so neuerthelesse there is some *Distance* required in both.

Visibles are swifter carried to the *Sense*, than *Audibles*; As appeareth in Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which haue beene set downe heretofore, but are proper for this *Title*.

273

I conceiue also, that the *Species* of *Audibles* doe hang longer in the Aire, than those of *Visibles*: For although euen those of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* fillipped; A *Fire-brand* caried along, which leaueth a Traine of Light behinde it; and in the *Twilight*; And the like: Yet I conceiue that *Sounds* stay longer, because they are carried vp and downe with the Winde: And because of the Distance of the Time, in *Ordinance discharged*, and heard twenty Miles off.

274

In *Visibles*, there are not found *Obiects* so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate *Obiects*. And therefore in *Pictures*, those foule *Sights* doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the *Eare* doth straight-waies refuse.

275

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring light*, the *Eye* is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after a *deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neare the *Cataracts* of *Nilus*, are stricken deafe: But we finde no such effect, in Cannoniers, nor Millers, nor those that dwell vpon Bridges.

276

It seemeth that the *Impression* of *Colour* is so weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; wherof the Basis is in the *Obiect*, and the Verticall Point in the *Eye*; So as there is a Corradiation and Coniunction of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, wherof we speake not. For the *Beames* passe, and giue little Tincture to that Aire, which is Adiacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body* of *Light*. For when there is a Skreene between the Candle and the *Eye*, yet the *Light* passeth to the Paper wheron One writeth; So that the *Light* is seene, where the *Body* of the *Flame* is not seene; And where any *Colour* (if it were placed where the *Body* of the *Flame* is) would not be seene. I iudge that *Sound* is of this Latter Nature:

277

Experiments
in Consort,
touching the
Sympathy or
Antipathy of
Sounds, one
with another.

278

ture: For when two are placed on both sides of a Wall, and the Voice is heard, I iudge it is not onely the *Originall Sound*, which passeth in an *Arched Line*; But the *Sound*, which passeth about the Wall in a Right Line, begetteth the like Motion round about it, as the first did, though more weake.

279

All *Concords* and *Discords* of *Musicke*, are, (no doubt,) *Sympathies*, and *Antipathies* of *Sounds*. And so (likewise) in that *Musicke*, which we call *Broken Musicke*, or *Consort Musicke*; Some *Consorts* of *Instruments* are sweeter than others; (A Thing not sufficiently yet obserued:) As the *Irish Harpe*, and *Base Viall* agree well: The *Recorder* and *Stringed Musick* agree well: *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welch-Harpe*, and *Irish-Harpe*; Or the *Voice* and *Pipes* alone, agree not so well; But for the *Melioration* of *Musicke*, there is yet much left (in this Point of *Exquisite Consorts*) to try and enquire.

There is a Common Obseruation, that if a *Lute*, or *Viall*, be layed vpon the Backe, with a small Straw vpon one of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute* or *Viall*, the *Vnison* to that *String* be strucken; it will make the *String* moue; Which will appeare both to the Eye, and by the *Strawes* Falling off. The like will be, if the *Diapason* or *Eight* to that *String* be strucken, either in the same *Lute*, or *Viall*, or in others lying by; But in none of these there is any Report of *Sound*, that can be discerned, but onely Motion.

280

It was deuised, that a *Viall* should haue a Lay of Wire Strings below, as close to the Belly, as a *Lute*; And then the *Strings* of Guts mounted vpon a Bridge, as in Ordinary *Vialls*; To the end, that by this means, the vpper *Strings* strucken, should make the lower resound by *Sympathy*, and so make the *Musicke* the better; Which, if it be to purpose, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this deuice I conceiue to be of no vse; because the vpper *Strings*, which are stopped in great variety, cannot maintaine a *Diapason* or *Vnison*, with the Lower, which are neuer stopped. But if it should be of vse at all; it must be in *Instruments* which haue no Stops; as *Virginalls*, and *Harpes*; wherein triall may be made of two Rows of *Strings*, distant the one from the other.

281

The *Experiment* of *Sympathy* may be transferred (perhaps) from *Instruments* of *Strings*, to other *Instruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Vnison*, whether the striking of the one would moue the other, more than if it were another Accord: And so in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would moue in the one *Pipe*, when the other is blowne at an *Vnison*.

282

It seemeth, both in *Eare*, and *Eye*, the *Instrument* of *Sense* hath a *Sympathy* or Similitude with that which giueth the *Reflexion*; (As hath beene touched before.) For as the *Sight* of the *Eye* is like a *CrySTALL*, or *Glasse*, or *Water*; So is the *Eare* a sinuous Caue, with a hard Bone, to stop

stop and reuerberate the *Sound*: Which is like to the Places that report *Eccho's*.

When a Man *Tawneth*, he cannot *Heare* so well. The *Cause* is, for that the *Membrane* of the *Eare* is extended; And so rather casteth off the *Sound*, than draweth it to.

We *Heare* better when we *hold our Breath*, than contrary; In so much as in all *Listening* to attaine a *Sound* a farre off, Men *hold their Breath*. The *Cause* is, For that in all *Expiration*, the Motion is Outwards; And therefore, rather driueth away the voice, than draweth it: And besides we see, that in all *Labour* to doe things with any strength, we *hold the Breath*: And listening after any *Sound*, that is heard with difficulty, is a kinde of *Labour*.

Let it be tryed, for the *Helpe* of the *Hearing*, (and I conceiue it likely to succeed,) to make an *Instrument* like a *Tunnell*; The narrow Part whereof may be of the Bignesse of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length halfe a foot, or more. And let the narrow End of it be set close to the *Eare*: And marke whether any *Sound*, abroad in the open *Aire*, will not be heard distinctly, from further distance, than without that *Instrument*; being (as it were) an *Eare-Spectacle*. And I haue heard there is in *Spaine*, an *Instrument* in vse to be set to the *Eare*, that *helpeth* somewhat those that are *Thicke* of *Hearing*.

If the *Mouth* be shut close, neuerthelesse there is yeelded by the Roofe of the Mouth, a Murmur. Such as is vsed by dumbe Men; But if the *Nostrills* be likewise stopped, no such Murmur can be made; Except it be in the Bottome of the *Pallate* towards the Throat. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as afore-said, if the *Mouth* be stopped, passeth from the *Pallate*, thorow the *Nostrills*.

The *Repercussion* of *Sounds*, (which we call *Eccho*,) is a great Argument of the *Spiritual Essence* of *Sounds*. For if it were *Corporeall*, the *Repercussion* should be created in the same maner, and by like *Instruments*, with the *Original Sound*: But we see what a Number of *Exquisite Instruments* must concur in Speaking of Words, whereof there is no such Matter in the Returning of them; But onely a plaine Stop, and *Repercussion*.

The *Exquisite Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Seales make excellent Impressions: And so it may be thought of *Sounds* in their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparently they cannot be Impressions.

All *Sounds* are suddenly made, and doe suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration: For the *Quauerings*, and *Warblings* in *Lutes*, and *Pipes*, are

Experiments
in Consort,
touching the
Hindring or
Helping of the
Hearing.

283

284

285

286

Experiments
in Consort
touching the
Spiritual and
Fine Nature of
Sounds.

287

288

289

are as swift; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are vttered. But that *Sounds* should not onely be so speedily generated, but carried so farre euery way, in such a momentany time, deserueth more Admiration. As for Example; If a Man stand in the middle of a Field, and speake aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in euery little Portion of the Aire; And this shall be done in the Space of lesse than a Minute.

The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two Waies. Either that the *Aire* suffereth some Force by *Sound*, and then restoreth it selfe; As Water doth; Which being diuided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; For that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiuing the *Sound* at the first; But then other Grosse and more Materiate Qualities of the Aire straightwaies suffocate it; Like vnto *Flame*, which is generated with Alacrity, but straight quenched by the Enmity of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are diuided; 1. *Musical*, *Immusical*; 2. *Treble*, *Base*; 3. *Flat*, *Sharpe*; 4. *Soft*, *Loud*; 5. *Exteriour*, *Interiour*; 6. *Cleane*, *Harsh* or *Purling*; 7. *Articulate*, *Inarticulate*.

We haue laboured (as may appeare,) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning:) And because it is a *Vertue* which may be called *Incorporeall*, and *Immateriate*; wherof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*,) to make a *Pat-tem* or *President* of an *Exact Inquisition*; And we shall doe the like hereafter in some other Subiects which require it. For we desire that Men should learne and percciue, how seuer a Thing the true *Inquisition* of *Nature* is; And should accustom themselves, by the light of Particulars, to enlarge their *Mindes*, to the Amplitude of the World; And not reduce the World to the Narrownesse of their *Mindes*.

Metals giue *Orient* and *Fine Colours* in *Dissolutions*; As *Gold* giueth

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an excellent Yellow; *Quick-Silver* an excellent Greene; *Tinne* giueth an excellent Azure: Likewise in their *Putrefactions*, or *Rusts*; As *Vermilion*, *Verdegrease*, *Bise*, *Cirrus*, &c. And likewise in their *Vitrifications*. The Cause is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture; And againe to retaine Part of their principall Spirit; Which two Things, (Equall Posture, and Quicke Spirits) are required chiefly, to make Colours lightsome.

ching the Orient Colours, in dissolution of Metalls.

291

It conduceth vnto *Long Life*, and to the more Placide Motion of the Spirits, which thereby doe lesse prey and consume the Iuyce of the Body; Either that *Mens Actions* bee free and voluntary; That nothing bee done *Inuitâ Minervâ*, but *Secundum Genium*: Or on the other side, that the *Actions* of Men bee full of Regulation, and Commands within themselves: For then the Victory and Performing of the Command, giueth a good Disposition to the Spirits; Especially if there bee a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Countrey life; And of the latter, in *Monkes* and *Philosophers*, and such as doe continually enioyne themselves.

Experiment Solitary touching Prolongation of Life.

292

It is certaine, that in all Bodies, there is an *Appetite* of *Vnion*, and Euitation of Solution of Continuity: And of this *Appetite* there bee many Degrees; But the most Remarkable, and fit to bee distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*: And the third in *Bodies Cleaning* or *Tenacious*. In *Liquours*, this *Appetite* is weake: Wee see in *Liquours*, the *Thredding* of them in *Stillicides*, (as hath beene said;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles* and *Froth*. In the second Degree or *Kinde*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For such *Bodies* doe partly follow the Touch of another Body; And partly sticke and continue to themselves; And therefore they roape, and draw themselves in Threds; As wee see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleaning*, more or lesse: And that they loue better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantity, cleaueth to any Thing that is *Solide*; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaueth: But those *Bodies* which are noted to bee Clammy, and *Cleaning*, are such, as haue a more indifferent *Appetite* (at once,) to follow another *Body*; And to hold to Themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a Forraine

Experiment Solitary touching Appetite of Vnion in Bodies.

293

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Body,

Body, than in preserving their owne *Consistence*; And which haue little predominance in *Drought*, or *Moisture*.

Experiment
Solitary touching the like
Operations of
Heat, and Time.

294

Time, and *Heat*, are Fellowes in many Effects. *Heat* drieth Bodies, that doe easily expire; As Parchment, Leaues, Roots, Clay, &c. And, so doth *Time* or *Age* arefie; As in the same Bodies, &c. *Heat* dissolueth and melteth Bodies, that keepe in their Spirits; As in diuers *Liquefactions*; And so doth *Time*, in some Bodies of a softer *Consistence*: As is manifest in Honey, which by *Age* waxeth more liquid; And the like in Sugar; And so in old Oyle, which is euer more cleare, and more hot in Medicinable vse. *Heat* causeth the Spirits to search some Issue out of the Body; As in the *Volatility* of *Metalls*; And so doth *Time*; As in the *Rust* of *Metalls*. But generally *Heat* doth that in small time, which *Age* doth in long.

Experiment
Solitary touching the differing
Operations of Fire, and
Time.

295

Some Things which passe the *Fire* are softest at first, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards giue againe, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The Cause is, for that in those things which waxe Hard with *Time*, the Worke of the *Fire* is a Kinde of *Melting*: And in those that waxe Soft with *Time*, (contrariwise,) the worke of the *Fire* is a Kinde of *Baking*; And whatsoeuer the *Fire* baketh, *Time* doth in some degree dissolue.

Experiment
Solitary touching Motions
by Imitation.

296

Motions passe from one Man to another, not so much by Exciting Imagination; as by Inuitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heauy, by any Vapour, or the like. For then they striue, (as it were,) to wring out, and expell that which loadeth them. So Men drowzy, and desirous to sleepe; Or before the Fit of an Ague; doe vse to Yawne and Stretch; And doe likewise yeeld a *Voice* or *Sound*, which is an *Interiection* of *Expulsion*: So that if another be apt and prepared to doe the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment
Solitary, touching Infectious
Diseases.

297

There be some knowne *Diseases* that are *Infectious*; And Others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Body to Body: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as Taint the *Breath*; Which wee see passeth manifestly from Man to Man; And not inuisibly, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the Body
Adiacent.

Adjacent; Especially if they consist in an Viscuous Substance, not apt to dissipate; Such are *Scabs*, and *Leprousie*. Fourthly, such as are meerely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they neuer infect, but by *Touch* onely; And such a *Touch* also, as commeth within the *Epidermis*; As the Venome of the *French Poxe*; And the *Biting* of a *Mad Dog*.

Most *Powders* grow more Close and Coherent by *Mixture* of *Water*, than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body; As *Meale*; &c. The Reason is the Congruity of Bodies; which if it be more, maketh a Perfecter Imbibition, and Incorporation; Which in most *Powders* is more betweene *Them* and *Water*, than betweene *Them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiment
Solitary touching the
Incorporation of
Powders and
Liquours.

298

Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for Others. If the Body be Hot, and Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much vpon *Exercise*. Likewise Men ought to beware, that they vse not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Pleasant Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that it helpeth to Excerne by *Sweat*, and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Euills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it be much, is no Friend to *Prolongation* of *Life*; Which is one Cause, why *Women* liue longer than *Men*, because they stirre lesse.

Experiment
Solitary, touching
Exercise
of the *Body*.

299

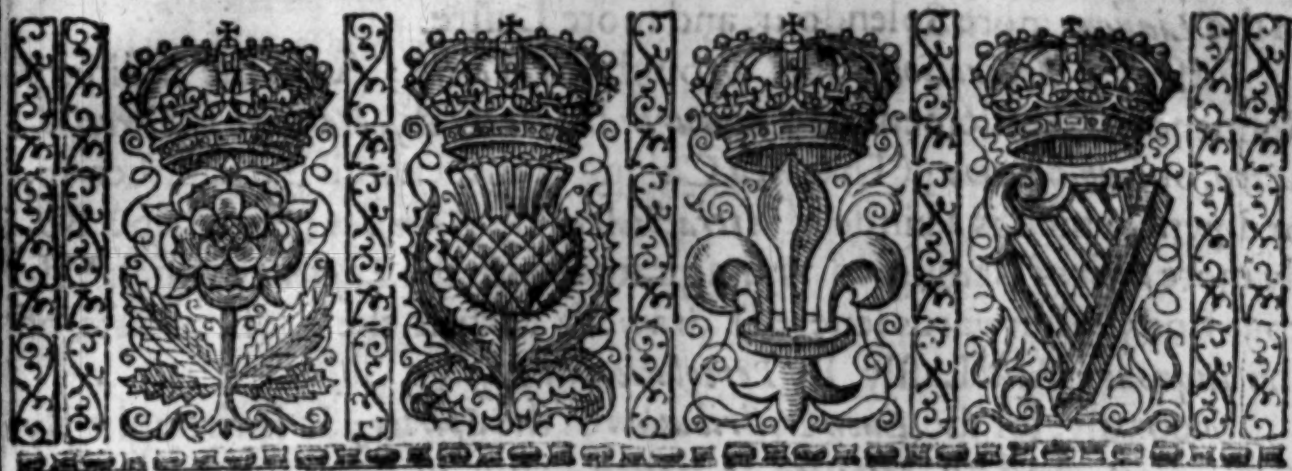
Some *Food* we may vse long, and much, without *Glutting*; As Bread, *Flesh* that is not fat, or rancke, &c. Some other, (though pleasant,) *Glutted* sooner; As Sweet Meats, Fat Meats, &c. The Cause is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the Stomacke; Or possessing it with somewhat that is Astringent; And therefore Cold and Dry. But things that are Sweet and Fat, are more Filling: And do swimme and hang more about the Mouth of the Stomacke; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and euer abateth the Appetite. Wee see also, that another Cause of *Satiety*, is an *Ouer-custome*; and of *Appetite* is *Novelty*: And therefore Meats, if the same be continually taken, induce *Loathing*. To giue the Reason of the *Distast* of *Satiety*, and of the Plea-

Experiment
Solitary, touching
Meats,
that induce Sa-
ciety.

300

sure in Novelty; and to distinguish not onely in Meats and Drinkes, but also in Motions, Loves, Company, Delights, Studies, what they be that *Custom* maketh more gratefull; And what more tedious; were a large Field. But for Meats, the Cause is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a Relish by former vse. And (generally) it is a Rule, that whatsoeuer is somewhat Ingrate at first, is made Gratefull by *Custom*; But whatsoeuer is too Pleasing at first, groweth quickly to *Satiate*.

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NATVRALL HISTORIE.

IV. Century.



ACCELERATION of *Time*, in *Works* of *Nature*, may well be esteemed *Inter Magnalia Nature*. And euen in *Diuine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therefore proceed to the Enquiry of it : And for *Acceleration* of *Germination*, we will referre it ouer, vnto the place, where we shall handle the Subiect of *Plants*, generally ; And will now begin with other *Accelerations*.

Liquours are (many of them,) at the first, thicke and troubled ; As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Hearbs* expressed, &c. And by *Time* they settle, and Clarifie. But to make them cleare, before the *Time*, is a great Worke ; For it is a Spurre to *Nature*, and putteth her out of her pace : And besides, it is of good vse, for making *Drinkes*, and *Sauces*, Potable, and Seruiceable, speedily ; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Separation* of the *Grosser Parts* of the *Liquour*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquour*, with the *Tangible Parts* : For that euer representeth Bodies Cleare and Vntroubled.

Experiments
in Consort
touching the
Clarification of
Liquours, and
the *Accelerating*
thereof.

bled. The third, by the *Refining* the *Spirit* it selfe, which therby giueth to the *Liquour* more Splendour, and more Lustre.

302

First, for *Separation*; It is wrought by *Weight*; As in the ordinary Residence or Settlement of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the seuerall Parts, either vp, or downe, which is a kinde of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*; which Viscous Body (afterwards seuered) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*.

303

Secondly, for the *Even Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we speake not, because it is that, we would anticipate & represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better passe thorow.

304

Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise By *Heat*; By *Motion*; And By *Mixture* of some *Body* which hath *Vertue* to attenuate. So therfore (hauing shewen the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trialls*.

305

It is in common Practise, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) wherby it will *Clarifie* much the sooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it lasting; yet withall they cast vp some Spissitude: And this *Instance* is to be referred to *Separation*.

306

On the other side, it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therfore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessell from the *Lees*, and powre the *Lees* of the Racked Vessell into the vnacked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307

Take *New Beere*, and put in some Quantitie of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, wherby they may fall downe into *Lees*. And this *Instance* againe is referred to *Separation*.

308

The longer *Malt*, or *Herbs*, or the like, are Infused in *Liquour*, the more thicke and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*, the clearer it is. The Reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or setteth at the Bottome. And therfore the most Exact Way to *Clarifie* is; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Malt* first Infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309

Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost

almost to the very Neck: Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* euery day, by the space of Ten Dayes; and then compare it with another Bottle of the same *Beere* set by. Take also *Lime* both *Quenched*, and *Unquenched*, and set the Bottles in them, *ut supra*. This *Instance* is referred, both to the *Even Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

Take Bottles, and Swing them; Or Carry them in a *Wheele-Barrow*, upon *Rough Ground*; twice in a day: But then you may not fill the Bottles full, but leaue some *Aire*; For if the *Liquour* come close to the Stopple, it cannot play, nor flower: And when you haue shaken them well, either way, poure the *Drinke* into another Bottle, stopped close, after the vsuall manner; For if it stay with much *Aire* in it, the *Drinke* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24. houres: Then take it, and put it againe into a Bottle with *Aire*, *ut supra*: And thence into a Bottle Stopped, *ut supra*: And so repeat the same Operation for seuen dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to trie it in a Bottle with a little *Aire* below the Neck, without Emptying. This *Instance* is referred to the *Even Distribution* and *Refining* of the *Spirits* by *Motion*.

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*;) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New Beere*, and stirred with it; For it may be that the *Grosser Part* of the *Beere* will cleaue to the *Milke*: The Doubt is, whether the *Milke* will seuer well againe; Which is soone tried. And it is vsuall in *Clarifying Ippocrasse* to put in *Milke*; Which after seuereth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they run *New Beere*, they vse to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be.

The *Accelerating* of *Maturation* wee will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes*, and *Ulcers*. This last we referre to another Place, where wee shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metalls*, &c. whereof we will speake as *Occasion* serueth. But we will begin with that of *Drinkes*, because it hath such *Affinitie* with the *Clarification* of *Liquours*.

For the *Maturation* of *Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the *Grosser Parts*: And it is effected partly, by the same meanes, that *Clarification* is, (whereof wee spake before;) But then note, that an *Extreme Clarification* doth

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spread

310

311

Experiments
in Confort
touching *Ma-
turation*, and
the *Accelerating*
thereof. And
first touching
the *Maturation*
and *Quickning*
of *Drinks*. And
next touching
the *Maturation*
of *Fruits*.

312

spread the *Spirits* so Smooth, as they become Dull, and the *Drinke* dead, which ought to haue a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

313

We see the *Degrees of Maturation of Drinkes*; In *Must*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well Congregated; *Wine* hath them well vnited; so as they make the Parts somewhat more Oylie: *Vinegar* hath them Congregated, but more Ieiune, and in smaller Quantitie; The greatest and finest Spirit and Part being exhaled: For we see *Vinegar* is made by setting the Vessell of *Wine* against the hot Sun: And therefore *Vinegar* will not burne; For that much of the Finer Parts is Exhaled.

314

The *Refreshing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So wee see that *Open Weather* relaxeth the *Spirit*, and maketh it more liuely in *Motion*. Wee see also *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit*, (so that it spirteth when the Stopple is taken forth) maketh the *Drinke* more quicke and windie. A *Pan* of *Coales* in the *Cellar* doth likewise good, and maketh the *Drinke* worke againe. *New Drinke*, put to *Drinke* that is *Dead*, prouoketh it to worke againe: Nay, which is more, (as some affirme,) A *Brewing* of *New Beere*, set by *Old Beere*, maketh it worke againe. It were good also to *Enforce* the *Spirits* by some *Mixtures*, that may excite and quicken them; As by Putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We see *Creame* is *Matured*, and made to rise more speedily, by Putting in *Cold Water*; which, as it seemeth, getteth downe the *Whey*.

315

It is tried, that the *Burying* of *Bottles* of *Drinke* well stopped, either in drie *Earth*, a good depth; Or in the *Bottom* of a *Well* within *Water*; And best of all the *Hanging* of them in a deepe *Well* somewhat above the *Water*, for some forthnights space, is an Excellent *Meanes* of making *Drink* fresh, and quicke: for the *Cold* doth not cause any *Exhaling* of the *Spirits* at all; As *Heat* doth, though it rarifieth the rest that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they Incorporate the Parts of the *Liquour* perfectly.

316

As for the *Maturation of Fruits*; It is wrought by the *Calling forth* of the *Spirits* of the *Body* outward, and so *Spreading* them more smoothly: And likewise by *Digesting*, in some degree, the *Grosser Parts*: And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment* of *Putrefaction*: For the *Inception* of *Putrefaction* hath in it a *Maturation*.

317

There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Covered ouer with *Onions*; Covered ouer with *Crabs*; Closed vp in *Wax*; Shut in a *Box*; &c. There was also an *Apple* hanged vp in *Smoake*: Of all which the *Experiments* sorted in this Manner.

318

After a *Moneths* Space, the *Apple* Enclosed in *Wax*, was as *Greene* and *Fresh* as at the first Putting in, and the *Kernells* continued *White*. The Cause is, for that all *Exclusion* of *Open Aire*, (which is euer *Predatory*) maintaineth the *Body* in his first *Freshnesse*, and *Moisture*: But the *Inconuenience*

convenience is, that it tasteth a little of the *Wax*: Which, I suppose, in a *Pomgranate*, or some such thick-coated *Fruit*, it would not doe.

The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Drie, Soft, Sweet, Yellow within. The *Cause* is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (For we see that in a greater *Heat*, a *Roast Apple* Softneth and Melteth; And *Pigs feet*, made of *Quarters of Wardens*, scorch and haue a Skin of Cole) doth Mellow, and not Adure: The *Smoake* also maketh the *Apple* (as it were) sprinkled with *Soot*, which helpeth to *Mature*. We see that in *Drying* of *Pearces*, and *Prunes*, in the *Ouen*, and Remouing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intense degree of *Heat*.

The *Apples* couered in the *Lime* and *Ashes*, were well *Matured*; As appeared both in their *Yellownesse*, and *Sweetnesse*. The *Cause* is, for that that *Degree of Heat* which is in *Lime*, and *Ashes*, (being a Smoothing *Heat*) is of all the rest most Proper; for it doth neither Liquefie, nor Arcfie; And that is true *Maturation*. Note that the Taste of those *Apple*: was good; And therefore it is the *Experiment* fittest for *Vse*.

The *Apples*, Couered with *Crabs*, and *Onions*, were likewise well *Matured*. The *Cause* is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*; which taketh away *Hardnesse*. So wee see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first vpon a heape. So one *Cluster* of *Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botrum citius maturescit*.

The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not so much as the Other; But the *Apple* in the *Straw* more. The *Cause* is, for that the *Hay* and *Straw* haue a very low degree of *Heat*, but yet Close and Smoothing, and which drieth not.

The *Apple* in the *Close Box*, was ripened also: The *Cause* is, for that all Aire, kept close, hath a degree of *Warmth*: As we see in *Wooll*, *Furres*, *Plush*, &c.

Note that all these were Compared with another *Apple*, of the same kinde, that lay of it Selfe: And in Comparison of that, were more Sweet, and more Yellow, and so appeared to be more Ripe.

Take an *Apple*, or *Peare*, or other like *Fruit*, and Rowle it vpon a Table hard: Wee see in Common Experience, that the *Rowling* doth Soften and Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts: For the *Vnequall Distribution* of the *Spirits* maketh the *Harshnesse*: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therefore, if you should Rowle them but gently, perhaps twice a day; And continue it some seuen dayes, it is like they would *mature* more finely, and like vnto the *Naturall Maturation*.

Take an *Apple*, and cut out a Peece of the Top, and couer it, to see whether that *Solution of Continuities* will not hasten a *Maturation*: We see

that where a *Wasse*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily.

326

Take an *Apple*, &c. and pricke it with a *Pinne* full of *Holes*, not deepe, and smeare it a little with *Sacke*, or *Cinnamon Water*, or *Spirit of Wine*, every day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these *Trialls* also, as was used in the first, set another of the same *Fruits* by, to Compare them: And trie them, by their *Yellownesse*, and by their *Sweetnesse*.

Experiment
Solitary, touch-
ing the Ma-
king of Gold.

The World hath beene much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I iudge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the *Practise*, full of *Errour* and *Imposture*; And in the *Theory*, full of *unsound Imaginations*. For to say, that *Nature* hath an *Intention* to make all *Metals Gold*; And that, if she were deliuered from *Impediments*, she would performe her owne *Worke*; And that, if the *Crudities*, *Impurities*, and *Leprosities* of *Metals* were cured, they would become *Gold*; And that a little *Quantitie* of the *Medicine*, in the *Worke* of *Proiection*, will turne a *Sea* of the *Basest Metall* into *Gold*, by *Multiplying*: All these are but *dreames*; And so are many other *Grounds* of *Alchymy*. And to helpe the Matter, the *Alchymists* call in likewise many *Vanities*, out of *Astrologie*; *Naturall Magicke*; *Superstitious Interpretations* of *Scriptures*; *Auricular Traditions*; *Fained Testimonies* of *Ancient Authors*; And the like. It is true, on the other side, they haue brought to light not a few profitable *Experiments*, and thereby made the World some amends. But wee, when wee shall come to handle the *Version* and *Transmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true *Wayes* and *Passages* of *Nature*, which may leade to this great *Effect*. And wee commend the wit of the *Chineses*, who despaire of *Making of Gold*, but are Mad vpon the *Making of Siluer*: For certaine it is, that it is more difficult to make *Gold*, (which is the most *Ponderous* and *Materiate* amongst *Metalls*) of other *Metalls*, lesse *Ponderous*, and lesse *Materiate*; than (*via versa*) to make *Siluer* of *Lead*, or *Quick-Siluer*; Both which are more *Ponderous* than *Siluer*; So that they
need

need rather a further Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and therby Turning some of them into *Gold*: For we conceiue indeed, that a perfect good *Concoction*, or *Digestion*, or *Maturation* of some *Metalls*, will produce *Gold*. And here we call to minde, that wee knew a *Dutch-man*, that had wrought himselfe into the beleefe of a great Person, by vndertaking that he could make *Gold*: Whose discourse was, that *Gold* might be made; But that the *Alchymists* Ouer-fired the Worke: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lampe, that should carry a Temperate and Equall Heat: And that it was the Worke of many Moneths. The Deuice of the Lampe was folly; But the Ouer-firing now vsed; And the Equall Heat to be required; And the Making it a Worke of some good Time; are no ill Discourses.

We resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The First is, that there be *used* a *Temperate Heat*; For they are euer *Temperate Heats* that *Disgest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subiect*; For that may be *Temperate* to *Fruits*, and *Liquours*, which will not worke at all vpon *Metalls*. The Second is, that the *Spirit of the Metall* be quickened, and the *Tangible Parts* opened: For without those two Operations, the *Spirit of the Metall*, wrought vpon, will not be able to disgest the Parts. The Third is, that the *Spirits* doe spread themselves *Euen*, and moue not *Subsultorily*; For that will make the Parts Close, and Pliant. And this requireth a Heat, that doth not rise and fall, but continue as *Equall* as may be. The Fourth is, that no *Part of the Spirit* be emitted, but detained: For if there be *Emission of Spirit*, the Body of the *Metall* will be Hard, and Churlish. And this will be performed, partly by the Temper of the Fire; And partly by the closenesse of the Vessell. The Fifth

Fifth is, that there be *Choice made of the likeliest and best Prepared Metall, for the Version*: For that will facilitate the Worke. The Sixth is, that you giue *Time enough for the Worke*: Not to prolong Hopes (as the Alchymists doe;) but indeed to giue *Nature* a conuenient Space to worke in. These Principles are most certaine, and true; Wee will now deriue a direction of *Triall* out of them; Which may (perhaps) by further Meditation, be improved.

327

Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be such, as may keepe the *Metall perpetually Moulten*, and no more; For that about all importeth to the Worke. For the Materiall, take *Siluer*, which is the *Metall* that in Nature Symbolizeth most with *Gold*; Put in also, with the *Siluer*, a Tenth Part of *Quick-siluer*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*: And so let the Worke be continued by the *Space of Six Moneths*, at the least. I wish also, that there be, at some times, an Iniection of some *Oyled Substance*; Such as they vse in the Recouering of *Gold*, which by Vexing with Separations hath beene made Churlish: And this is, to lay the Parts more Close and Smooth, which is the Maينه Worke. For *Gold* (as we see) is the Closest (and therefore the Heauiest) of *Metalls*: And is likewise the most Flexible, and Tensible. Note, that to thinke to make *Gold* of *Quick-siluer*, because it is the heauiest, is a Thing not to be hoped; For *Quick-siluer* will not endure the Mannage of the *Fire*. Next to *Siluer*, I thinke *Copper* were fittest to bee the *Materiall*.

Experiment
Solitary touching the
Nature of Gold.

328

Gold hath these *Natures*: *Greatnesse of Weight*; *Closenesse of Parts*; *Fixation*; *Pliantnesse*, or *Softnesse*; *Immunity from Rust*; *Colour* or *Tincture of Yellow*. Therefore the Sure Way, (though most about,) to make *Gold*, is to know the *Causes* of the *Seuerall Natures* before rehearsed, and the *Axiomes* concerning the same. For if a Man can make a *Metall*, that hath all these *Properties*, Let Men dispute, whether it be *Gold*, or no?

Experiments
in Confort touching the
Enducing and Accelerating of
Putrefaction.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Vniuersall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which euer are Vnquiet to *Get forth*, and *Congregate* with the *Aire*, and to enioy the *Sun-beames*. The *Getting forth*, or *Spreading* of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing *Operations*. If
the

the *Spirits* be detained within the Body, and moue more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildely, there followeth *Disgestion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* be not meerey Detained, but Protrude a little, and that Motion be Confused, and Inordinate, there followeth *Putrefaction*; Which euer dissolueth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metalls*. But if that Motion be in a certaine Order, there followeth *Viuiification*, and *Figuration*; As both in *Liuing Creatures* bred of *Putrefaction*, and in *Liuing Creatures Perfect*. But if the *Spirits* issue out of the Body, there followeth *Deficcation*, *Induration*, *Consumption*, &c. As in *Bricke*, *Euaporation of Bodies Liquid*, &c.

The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; First by *Adding some Crude or Watry Moisture*; As in *Wetting* of any *Flesh*, *Fruit*, *Wood*, with *Water*, &c. For contrariwise *Vnctuous* and *Oily Substances* preserue. 329

The Second is by *Inuitation* or *Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is *Sound*: Or when *Dung* (which is a Substance already Putrified) is added to other Bodies. And this is also notably seene in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other Earth will. 330

The Third is, by *Closenesse*, and *Stopping*, which detaineth the *Spirits*, in *Prison*, more than they would; And thereby irritateth them to seeke Issue; As in *Corne*, and *Cloaths*, which waxe *Musty*; and therefore Open Aire (which they call *Aer perflabilis*) doth preserue: And this doth appeare more Euidently in *Agues*, which come (most of them,) of *Obstructions*, and *Penning* the *Humours*, which thereupon *Putrifie*. 331

The Fourth is, by *Solution of Continuity*; As we see an *Apple* will rot sooner, if it be Cut or Pierced; And so will *Wood*, &c. And so the *Flesh* of *Creatures* aliue, where they haue receiued any *Wound*. 332

The Fifth is, either by the *Exhaling*, or by the *Drining back* of the *Principall Spirits*, which preserue the Consistence of the *Body*; So that when their *Gouernment* is Dissolued, euery *Part* returneth to his Nature, or *Homogeny*. And this appeareth in *Vrine*, and *Bloud*, when they coole, and thereby breake; It appeareth also in the *Gangrene*, or *Mortification* of *Flesh*, either by *Opiates*, or by *Intense Colds*. I conceiue also the same Effect is in *Pestilences*, for that the *Malignity* of the *Infecting Vapour*, daunceth the *Principall Spirits*, and maketh them fly, and leaue their *Regiment*; And then the *Humours*, *Flesh*, and *Secondary Spirits*, doe dissolue, and breake, as in an *Anarchy*. 333

The

334

The Sixth is, when a *Ferraine Spirit*, Stronger and more Eager than the Spirit of the Body, entreteth the Body; As in the Stinging of Serpents. And this is the Cause (generally) that vpon all *Poysons* followeth Swelling: And we see Swelling followeth also, when the Spirits of the Body it selfe, Congregate too much; As vpon *Blowes*, and *Bruises*; Or when they are Pent in too much, as in Swelling vpon Cold. And we see also, that the Spirits comming of *Putrefaction* of Humours in *Agues*, &c. Which may be counted as *Ferraine Spirits*, though they be bred within the Body, doe Extinguish and Suffocate the *Naturall Spirits*, and Heat.

335

The Seuenth is, by such a *Weake Degree of Heat*, as setteth the Spirits in a little Motion, but is not able, either to digest the Parts, or to Issue the Spirits; As is seene in *Flesh* kept in a Roome that is not Coole; Whereas in a Coole and Wet Larder it will keepe longer. And wee see, that *Vinification* (whereof *Putrefaction* is the Bastard Brother,) is effected by such Soft Heats; As the Hatching of Egges; The Heat of the Wombe, &c.

336

The Eight is, by the *Releasing of the Spirits*; which before were close kept by the Solidnesse of their Couerture, and thereby their Appetite of Issuing checked; As in the *Artificiall Rusts* induced by strong Waters, in *Iron*, *Lead*, &c. And therefore *Wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softeneth the Crust, for the Spirits to come forth.

337

The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and dry*; As wee see in the Mouldring of Earth in Frosts, and Sunne; And in the more hasty Rotting of Wood, that is sometimes wet, sometimes dry.

338

The Tenth is, by *Time*, and the *Worke and Procedure of the Spirits themselves*, which cannot keepe their Station; Especially if they be left to themselves; And there be not Agitation or Locall Motion. As wee see in Corne not stirred; And Mens Bodies not exercised.

339

All Moulds are Inceptions of *Putrefaction*; As the Moulds of *Pyes*, and *Flesh*; the Moulds of *Orenge*s, and *Limon*s; which Moulds afterwards turne into Wormes, or more odious *Putrefactions*: And therefore (commonly) proue to be of ill Odour. And if the Body be Liquid, and not apt to Putrifie totally, it will cast vp a *Mother* in the Top; As the Mothers of *Distilled Waters*.

340

Mosse is a Kinde of Mould, of the Earth, and Trees. But it may be better sorted as a *Rudiment of Germination*; To which we referre it.

Experiments
in Conser-
uation, touch-
ing Pro-
hibiting and
Preventing Pu-
trefaction.

It is an Enquiry of Excellent vse, to Enquire of the Meanes of Preventing or Staying *Putrefaction*; For therein consisteth the Meanes of Conseruation of Bodies; For Bodies haue two Kindes of Dissolutions; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions* of

of the *Bodies* of Men, and *Liuing Creatures*, (as in Agues, Wormes, Consumptions of the Lungs, Impostumes, and Vicers both Inwards and Outwards,) they are a great *Part* of *Physicke*, and *Surgery*: And therefore we will reserve the *Enquiry* of them to the proper Place, where we shall handle *Medicinall Experiments* of all Sorts. Of the rest we will now Enter into an *Enquiry*: wherein much light may be taken, from that which hath beene said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Remouing that, which caused *Putrefaction*, doth *Preuent* and *Auoid Putrefaction*.

The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so wee see that Meat and Drinke will last longer, Vnputrified, or Vnsowred, in Winter, than in Summer: And we see that Flowers, and Fruits, put in Conseruatories of Snow, keepe fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*.

The Second is *Astriction*: For *Astriction* prohibiteh *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibit *Putrefaction*: And by the same reason of *Astringency*, some small Quantity of Oile of Vitrioll, will keepe Fresh Water long from *Putrefying*. And this *Astriction* is in a Substance that hath a *Virtuall Cold*; And it worketh (partly) by the same *Meanes* that *Cold* doth.

The Third is, the *Excluding* of the *Aire*; And againe, the *Exposing* to the *Aire*: For these *Contraries*, (as it commeth often to passe,) worke the same Effect, according to the Nature of the Subiect Matter. So we see, that *Beere*, or *Wine*, in Bottles close stopped, last long; That the *Garners* under Ground keepe Corne longer than those aboue Ground; And that *Fruit* closed in *Waxe* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keepe more fresh: And *Liquours*, *Drinkes*, and *Iuices*, with a little *Oyle* cast on the Top, keepe fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired*, doe breed Moathes, and Mould; And the Diuersity is, that in *Bodies* that need *Detention* of *Spirits*, the *Exclusion* of the *Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emission* of *Spirits*, to discharge some of the Superfluous Moisture, it doth hurt, for they require *Airing*.

The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Rest*; For the Subtill *Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As we see that Turning ouer of Corne in a Garner; Or Letting it runne like an Houre-glasse, from an vpper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens *Bodies*, Exercise hindreth *Putrefaction*; And contrariwise *Rest*, and Want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perspiration, is stayed,) further *Putrefaction*; As we partly touched a little before.

345

The Fifth is, the *Breathing forth of the Aduentitious Moisture in Bodies*; For as *Wetting* doth hasten *Putrefaction*; So *Conuenient Drying*, (wherby the more *Radical Moisture* is onely kept in,) putteth backe *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the Shade; Or dried in the hot Sunne, for a small time, keepe best. For the *Emission* of the *Loose* and *Aduentitious Moisture*, doth betray the *Radical Moisture*; And carryeth it out for Company.

346

The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a *Strong Spirit* likewise preserueth, and a *Weake* or *Faint Spirit* disposeth to *Corruption*. So we finde that *Salt-water* corrupteth not so soone as *Fresh*: And *Salting* of *Oysters*, and *Powdring* of *Mear*, keepeth them from *Putrefaction*. It would be tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserue it from *Putrefying*, or *Speedy Souring*. So wee see that *Strong Beere* will last longer than *Small*; And all Things, that are hot and *Aromaticall*, doe helpe to preserue *Liquours*, or *Powders*, &c. Which they doe, as well by *Strengthening the Spirits*, as by *Soaking out the loose Moisture*:

347

The Seuenth is, *Separation of the Cruder Parts*, and thereby making the *Body more Equall*; for all vnperfect Mixture is apt to *Putrefie*; And *Watry Substances* are more apt to *Putrefie*, than *Oily*. So we see *Distilled Waters* will last longer than *Raw waters*; And Things that haue passed the *Fire*, doe last longer, than those that haue not passed the *Fire*; As *Dried Peares*, &c.

348

The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Loose and watry Moisture*; Not onely for the Reason before giuen, that it prouoketh the *Radical Moisture* to come forth with it; But because being detained in the *Body*, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming dead Bodies*: And the same Reason is of *Preseruing Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

349

The Ninth is, the *Commixture of any Thing that is more Oily, or Sweet*: For such *Bodies* are least apt to *Putrefie*, the *Aire* working little vpon them; And they not putrefying preserue the rest. And therefore we see *Syrups*, and *Ointments*, will last longer, than *Iuyces*.

350

The Tenth is, the *Commixture of somewhat that is Dry*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is dry is vnapt to putrefie: And therefore *Smoake* preserueth *Flesh*; As wee see in *Bacon*, and *Neats-Tongues*, and *Martlemas Beefe*, &c.

351

The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserue *Bodies*, longer than other *Aires*, seemeth to mee Probable; For that the *Blowne Aires*, being *Over-charged* and *Compressed*, will hardly receiue the *Exhaling* of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, whereinto *Flesh* was put, and likewise a *Flower*, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather

ther further *Putrefaction*: The way were therefore, to blow strongly, with a Paire of Bellowes, into a Hoghead, putting into the Hoghead (before) that which you would haue preserued; And in the instant that you withdraw the Bellowes, stop the Hole close.

The *Experiment* of *Wood* that *Shineth* in the *Darke*, we haue diligently driuen, and pursued: The rather, for that of all Things, that giue Light here below, it is the most Durable; And hath least Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* shineth onely while it is in Scraping; And *Salt-water* while it is in Dashing; *Glow-wormes* haue their Shining while they liue, or a little after; Onely *Scales* of *Fishes* (Putrified) seeme to be of the same Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* sorted thus. 1. The *Shining* is in some Peecces more *Bright*, in some more *Dimme*; but the most *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *Woods* that haue beene tried to shine, are chiefly *Sallow*, and *Willow*; Also the *Ash*, and *Hasle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe shine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Day-light, is in some Peecces *White*, in some Peecces inclining to *Red*; Which in the Countrey they call the *White*, and *Red Garret*. 5. The Part that Shineth, is, (for the most part) somewhat *Soft*, and *Moist* to feele to; But some was found to be *Firme* and *Hard*; So as it might be figured into a *Crosse*, or into *Beads*, &c. But you must not looke to haue an Image, or the like, in any Thing that is *Lightsome*; For euen a face in *Iron* red Hot will not be seene, the *Light* confounding the small differences of *Lightsome* and *Darksome*, which shew the figure. 6. There was the *Shining Part* pared off, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* began also to *Shine*, being laid abroad in the Dew; So as it seemeth the *Putrefaction* spreadeth. 7. There was other dead *Wood* of like kinde, that was *Laid abroad*, which *Shined* not at the first; But after a Nights lying abroad began to *Shine*. 8. There was other *Wood*, that did *First shine*; And being laid dry in the House, within five or six daies, *Lost* the *Shining*; And laid abroad againe, *Recovered* the *Shining*. 9. *Shining woods*, being laid in a *Dry Roome*, within a Seuen night, lose their *Shining*; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boring of Holes*, in that kinde of *Wood*, and then laying it abroad, seemeth to conduce to make it *Shine*: The *Cause* is, for that all *Solution* of *Continuity* doth helpe on *Putrefaction*, as was touched before. 11. No *Wood* hath beene yet tried to *Shine*, that was cut *downe a line*, but such as was *Rotted*, both in *Stocke*, and *Root*, while it grew. 12. Part of the *Wood* that *Shined*, was *steeped in Oyle*, and retained the *Shining* a Fortnight. 13. The like succeeded in some *steeped in Water*, and much better. 14. How long the *Shining* will continue, if the *Wood* be *laid abroad every Night*, and *taken in* and *Sprinckled* with *Water* in the *Day*, is not yet tried. 15. *Triall* was

Experiment
Solitary, touching
Wood
Shining in the
Darke.

352

made of *laying it abroad in Frostie weather*, which hurt it not. 16. There was a great *Peerce* of a *Root* which did shine, and the *Shining Part* was *Cut off*, till no more Shined; Yet after two Nights, though it were kept in a drie Roome, it got a *Shining*.

Experiment
Solitary tou-
ching the *Accel-*
eration of Birth

353

The *Bringing forth* of *living Creatures* may be *accelerated* in two *Respects*: The one, if the *Embryon ripeneth* and perfecteth sooner: The other if there be some Cause from the *Mothers Body*, of *Expulsion* or *Putting it downe*: whereof the Former is good, and argueth Strength; The Latter is ill, and commeth by Accident or Disease. And therefore the *Ancient Observation* is true, that the *Childe borne in the Seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the most part) die. But the Cause assigned is Fabulous; Which is, that in the Eighth Moneth, should be the Returne of the Raigne, of the Planet *Saturne*: which (as they say) is a Planet Maligne; whereas in the Seventh is the Raigne of the *Moone*, which is a Planet Propitious. But the true Cause is, for that where there is so great a Prevention of the Ordinary time, it is the *lustinesse* of the *Childe*; But when it is lesse, it is some *Indisposition* of the *Mother*.

Experiment
Solitary tou-
ching the *Accel-*
eration of
growth and
Stature.

354

To *Accelerate Growth* or *Stature*, it must proceed; Either from the *Plentie* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the first, *Excesse* of *Nourishment* is hurtfull; For it maketh the *Childe Corpulent*; And Growing in Breadth, rather than in Heighth. And you may take an Experiment from *Plants*, which, if they spread much, are seldome tall. As for the *Nature* of the *Nourishment*; First, it may not be too *Drie*; And therefore Children in Dayrie Countries doe wax more tall, than where they feed more vpon Bread, and Flesh. There is also a received Tale; That *Boyling of Daisie Roots in Milke* (which it is certaine are great Driers) will make *Dogs* little. But so much is true, that an *Ouer-drie Nourishment* in Childhood putteth backe *Stature*. Secondly, the *Nourishment* must be of an *Opening Nature*; For that Attenuateth the Iuice, and furthereth the Motion of the Spirits, vpwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their Feeding vpon *Cardamon*; which (hee saith) made them grow better, and be of a more Active Habit. *Cardamon* is in Latine *Nasturtium*; And with vs *Water Cresses*; Which, it is certaine, is an Herbe, that whilest it is young, is Friendly to Life. As for the *Quickening* of *Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much Going to Schoole, where they sit so much, hindreth the *Growth* of *Children*; whereas Countrey People, that goe not to Schoole, are commonly of better *Stature*. And againe Men must beware, how they giue *Children*, any thing that is *Cold* in Operation; For euen *Long Sucking* doth hinder both *Wis.* and *Stature*. This hath beene tried, that a *Whelp*, that hath beene fed with *Nitre* in *Milke*, hath become

come very little, but extreme lively : For the *Spirit of Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life ; yet it is, in Children and young Creatures, an Enemy to *Growth* : And all for the same Reason ; For *Heat* is requisite to *Growth* : But after a Man is come to his Middle Age, *Heat* consumeth the Spirits ; which the Coldnesse of the Spirit of *Nitre* doth helpe to condense, and correct.

There betwo Great Families of Things ; You may terme them by severall Names ; *Sulphureous* and *Mercuriall*, which are the *Chymists* Words : (For as for their *Sal*, which is their Third Principle, it is a Compound of the other two ;) *Inflammable* and *Not Inflammable* ; *Mature* and *Crude* ; *Oily* and *Watry*. For we see that in *Subterrancies* there are, as the *Fathers* of their Tribes, *Brimstone* and *Mercury* : In *Vegetables*, and *Living Creatures* there is *Water* and *Oyle* : In the *Inferiour Order* of *Pneumaticalls* there is *Aire* and *Flame* : And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they be vnlike in the Primitiue Differences of Matter, yet they seeme to haue many Consents : For *Mercury* and *Sulphure* are principall Materialls of *Metalls* ; *Water* and *Oyle*, are principall Materialls of *Vegetables*, and *Animals* ; And seeme to differ but in *Maturation*, or *Concoction* : *Flame* (in *Vulgar Opinion*) is but *Aire Incensed* ; And they both haue Quicknesse of Motion, and Facility of Cession, much alike : And the *Interstellar Sky*, (though the Opinion be vaine, that the *Starre* is the *Denser Part* of his *Orbe*,) hath notwithstanding so much Affinity with the *Starre*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Nature*, to turne *Water*, or *Watry Iuyce*, into *Oile* or *Oily Iuyce* : Greater in Nature, than to turne *Siluer*, or *Quick-siluer*, into *Gold*.

The Instances we haue, wherein *Crude* and *Watry* Substance turneth into *Fat* and *Oily*, are of foure kindes. First in the *Mixture* of *Earth* and *Water* ; which mingled by the helpe of the *Sunne*, gather a *Nitrous Fatnesse*, more than either of them haue severally ; As we see, in that they put forth *Plants*, which need both Iuyces.

The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures* ; Whereof *Plants* turne the Iuyce of meere *Water* and *Earth*, into a great deal of *Oily Matter* : *Living Creatures*,

Experiments
in Confort
touching Sul-
phur and Mer-
cury, two of Pa-
racelsus Prin-
ciples.

355

356

tures, though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*, (as *Meat*, and *Bread*,) yet they Assimilate also in a Measure their *Drinke* of *Water*, &c. But these two Wayes of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time.

357

The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which haue a kinde of *Fatnesse*, or *Oyle*.

358

The Fourth is in the *Dulcoration* of some *Metalls*; As *Saccharum Saturni*, &c.

359

The Intention of *Version* of *Water* into a more *Oily Substance*, is by *Disgestion*; For *Oyle* is almost Nothing else but *Water digested*; And this *Disgestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Againe, it may be by Prouocation, or Excitation; Which is caused by the Mingling of Bodies already *Oily*, or *Disgested*; For they will somewhat Communicate their Nature with the rest. *Disgestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Disgested*; As in *Plants*, and *Living Creatures*, whose Nourishment is far more Crude than their Bodies: But this *Disgestion* is by a great Compassse, as hath beene said. As for the more full Handling of these two Principles, whereof this is but a Taste; (the Enquiry of which is one of the Profoundest Enquiries of Nature,) We leaue it to the *Title* of *Version* of *Bodies*; And likewise to the *Title* of the *First Congregations* of *Matter*; Which like a Generall Assembly of Estates, doth giue Law to all *Bodies*.

Experiment
Solitary touch-
ing Chamel-
eons.

360

A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head vnproportionably bigge; His Eyes great: He moueth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth: His Backe crooked; His Skin spotted with little Tumours, lesse Eminent nearer the Belly; His Taile slender, and long: On each Foot he hath five Fingers; three on the Outside, and two on the Inside; His Tongue of a maruellous Length in respect of his Body, and hollow at the end; Which he will launch out to prey vpon *Flies*. Of Colour Greene, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If hee be laid vpon Greene, the Greene predominateth; If vpon Yellow, the Yellow; Not so if he be laid vpon Blew, or Red, or White; Onely the Greene Spots receiue a more Orient Lustre: Laid vpon Blacke, he looketh al. Blacke, though not without a Mixture of Greene. He feedeth not onely vpon Aire, (though that be his principall Sustenance;) For sometimes hee taketh *Flies*, as was said; Yet some that haue kept *Chameleons* a whole yeare together, could neuer perceiue that euer they fed vpon any Thing else but Aire; And might obserue their Bellies to swell after they had exhausted the Aire, and closed their Iawes; Which they open commonly

monly against the Rayes of the Sunne. They haue a foolish Tradition in *Magicke*, that if a *Chameleon* be burnt vpon the Top of a House, it will raise a Tempest; Supposing (according to their vaine Dreames of *Sympathies*) because he nourisheth with Aire, his Body should haue great vertue to make Impression vpon the Aire.

It is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that those *Flames* are cleare, and cast not forth such Smoake, and Ashes, and Pumice, as *Mountain* *Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountaines*, and *Earth-quakes* which cast *Flame*. There be also some *Blinde Fires*, vnder *Stone*, which flame not out, but *Oyle* being powdered vpon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remoue the *Stone*, it is *Heat*, rather than *Flame*; Which neuerthelesse is sufficient to Enflame the *Oyle*.

Experiment
Solitary, touching
Subterranean
Fires.

361

It is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if Foule Cloaths be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the Scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And we see *Warne Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which seuereth and diuideth any thing that is foule, and Viscous, and sticketh vpon a Body.

Experiment
Solitary, touching
Nitre.

362

Take a *Bladder*, the greatest you can get; Fill it full of *Winde*, and tye it about the Necke with a Silke thred waxed; And vpon that put likewise *Wax* very close; So that when the Neck of the *Bladder* dryeth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot vnder the *Earth*, in a *Vault*, or in a *Conservatory* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after some Fortnights distance, see whether the *Bladder* be shrunk: For if it be, then it is plaine, that the *Coldnesse* of the *Earth*, or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Consequence.

Experiment
Solitary touching
Congealing of
Aire.

363

It is a Report of some good credit, that in *Deepe Caues*, there are *Pensile Crystall*, and *Degrees* of *Crystall* that drop from aboue; And in some other, (though more rarely) that rise from below. Which though it be chiefly the Worke of Cold, yet it may be, that *Water*, that passeth thorow the *Earth*, gathereth a Nature more clammy, and fitter to Congeale, and become Solide, than *Water* of it selfe. Therefore Triall would be made, to lay a Heape of *Earth*, in great Frosts, vpon a Hollow Vessell, putting a *Canuase* betweene, that it falleth not in: And poure *Water* vpon it, in such Quantitie, as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessell, and

Experiment
Solitary touching
Congealing of
Water into
Crystall.

364

and lesse apt to dissolue, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reuersed, it will helpe the Experiment. For it will make the Ice, where it Issueth, lesse in Bulke; And euermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment
Solitary tou-
ching Preser-
uing of Rose-
leaves, both in
Colour, & Smell.

365

Take *Damask* *Roses*, and pull them; Then dry them vpon the Top of an House, vpon a Lead or Tarras, in the hot Sunne, in a cleare day, betweene the Houres (onely) of twelue and two; or there abouts. Then put them into a Sweet Dry Earthen Bottle, or a Glasse, with narrow Mouthes, stuffing them close together, but without Bruising: Stop the Bottle, or Glasse, close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other Body, either by *Putrefaction*, or *Arefaction*, as the *Aduentitious Moisture*, which hangeth loose in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture*, along with it, when it selfe goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserue the Iuyce of the Body. Note that these *Roses*, when you take them from the *Drying*, haue little or no Smell; So that the Smell is a Second Smell, that issueth out of the *Flower* afterwards.

Experiments
in Consort,
touching the
Continuance of
Flame.

366

The Continuance of Flame, according vnto the diuersity of the Body Enflamed, and other Circumstances, is worthy the Enquiry; Chiefly, for that though Flame be (almost) of a Momentany Lasting, yet it receiue the More, and the Lesse: we will first therefore speake (at large) of Bodies Enflamed, wholly, and Immediately, without any *Wicke* to helpe the *Inflammation*. A Spoonfull of *Spirit of Wine*, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of *Spirit of Wine*, Mixed with the Sixth Part of a Spoonfull of *Nitre*, burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay-salt*, 83. Pulses. Mixed with the like Quantity of *Gunpowder*, which dissolued into a Blackewater, 110. Pulses. A Cube, or Pellet of *Yellow Wax*, was taken, as much as halfe the *Spirit of Wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonfull of *Milke*, it burnt to the space of 100. Pulses; And the *Milke* was crudled. Mixed with the Sixth Part of a spoonfull of *Water*, it burnt to the space of 86. Pulses; With an Equall Quantity of *Water*, onely to the space of 4. Pulses. A small *Pebble* was laid in the Middest, and the *Spirit of Wine* burnt to the space of 94. Pulses. A Peece of *Wood*, of the Bignesse of an Arrow, and about a Fingers length, was set vp in the Middest, and the *Spirit of Wine* burnt to the space of 94. Pulses. So that the *Spirit of Wine Simple*, endured the longest; And the *Spirit of Wine* with the *Bay-salt*, and the Equall Quantity of *Water*, were the shortest.

367

Consider well, whether the more speedy Going forth of the flame, be caused,

caused, by the *Greater Vigour* of the *Flame* in *Burning* ; Or by the *Resistance* of the *Body mixed*, and the *Aversion* thereof to take *Flame* : Which will appeare by the *Quantitie* of the *Spirit of Wine*, that remaineth after the *Going out* of the *Flame*. And it seemeth cleerely to be the latter; For that the *Mixture* of Things least apt to burne, is the *Speediest* in going out. And note, by the way, that *Spirit of Wine* burned, till it goe out of it selfe, will burne no more ; And tasteth nothing so hot in the Mouth, as it did ; No nor yet lowre, (as if it were a degree towards *Vinegar*,) which *Burnt Wine* doth ; but flat and dead.

Note, that in the *Experiment* of *Wax* aforesaid, the *Wax* dissolved in the burning, and yet did not incorporate it selfe, with the *Spirit of Wine*, to produce one *Flame* ; but wheresoeuer the *Wax* floated, the *Flame* forsooke it, till at last it spread all ouer, and put the *Flame* quite out.

The *Experiments* of the *Mixtures* of the *Spirit of Wine* enflamed, are Things of discouerie, and not of Vse : But now wee will speake of the *Continuance* of *Flames*, such as are vsed for *Candles*, *Lamps*, or *Tapers* ; consisting of *inflammable Matters*, and of a *Wicke* that prouoketh *Inflammation*. And this importeth not only *Discouerie*, but also *Vse* and *Profit* ; For it is a great *Sauing*, in all such *Lights*, if they can be made as faire and bright as others, and yet last longer. *Wax Pure* made into a *Candle*, and *Wax Mixed* seuerally into *Candle-stuffe*, with the *Particulars* that follow ; (viz. *Water*, *Aqua-vita*, *Milke*, *Bay-salt*, *Oyle*, *Butter*, *Nitre*, *Brimstone*, *Saw-dust*,) Euery of these bearing a *Sixth Part* to the *Wax* ; And euery of these *Candles mixed*, being of the same *Weight* and *Wicke* with the *Wax Pure*, proued thus in the *Burning*, and *Lasting*. The *Swiftest* in *Consuming* was that with *Saw-dust* ; Which first burned faire, till some part of the *Candle* was consumed, and the *Dust* gathered about the *Snafte* ; But then it made the *Snafte* bigge, and long, and to burne duskyishly, and the *Candle* wasted in halfe the time of the *Wax Pure*. The next in *Swiftnesse*, were the *Oyle*, and *Butter*, which consumed, by a *Fifth part*, swifter than the *Pure Wax*. Then followed in *Swiftnesse* the *Cleare Wax* it selfe. Then the *Bay-Salt*, which lasted about an *Eighth part* longer than the *Cleare Wax*. Then followed the *Aqua-vita*, which lasted about a *Fifth part* longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vita*, but the *Water* slowest. And in these foure last, the *Wicke* would spit forth little *Sparks*. For the *Nitre*, it would not hold lighted aboue some *Twelue Pulses* ; But all the while it would spit out *Portions* of *Flame*, which afterwards would goe out into a vapour. For the *Brimstone*, it would hold lighted, much about the same time with the *Nitre* ; But then after a little while, it would harden and cake about the *Snafte* ; So that the *Mixture* of *Bay-Salt* with *Wax*, will winne an *Eighth part* of the time of lasting, and the *Water* a *Fifth*.

After the *Seuerall Materialls* were tried, *Triall* was likewise made of *seuerall Wickes* ; As of *Ordinary Cotton* ; *Sowing Thred* ; *Rush* ; *Silke* ; *Straw* ; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they

368

369

370

they came to the *Wax*, and then goe out : of the Other Three, the *Thred* consumed faster than the *Cotton*, by a Sixth part of Time : The *Cotton* next ; Then the *Rush* consumed slower than the *Cotton*, by at least a third part of time. For the Bignesse of the *Flame*, the *Cotton*, and *Thred*, cast a *Flame* much alike ; and the *Rush* much lesse, and dimmer. *Quare*, whether *Wood*, and *Wickes* both, as in *Torches*, consume faster, than the *Wickes Simple*?

371

We haue spoken of the Seuerall *Materialls*, and the Seuerall *Wickes* : But to the *lasting* of the *Flame*, it importeth also ; Not only what the *Materiall* is, but in the same *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *Houfewines*, to make their *Candles* burne the longer, vse to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and so they Consume the slower : Insomuch, as by this meanes, they will out-last other *Candles*, of the same *Stuffe*, almost Halfe in Halfe. For *Bran* and *Flower* haue a Vertue to Harden : So that both Age, and lying in the *Bran*, doth helpe to the Lasting. And wee see that *Wax Candles* last longer than *Tallow Candles*, because *Wax* is more firme, and hard.

372

The *Lasting* of *Flame* also dependeth vpon the *easie Drawing* of the *Nourishment* ; As we see in the *Court* of *England*, there is a Service which they call *All-nights* ; which is (as it were) a great Cake of *Wax*, with the *Wicke* in the Middest ; whereby it commeth to passe, that the *Wicke* fetcheth the *Nourishment* further off. Wee see also that *Lamps* last longer, because the *Vessell* is farre broader, than the Breadth of a *Taper*, or *Candle*.

373

Take a *Turretted Lampe* of *Tinne*, made in the forme of a *Squire* ; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* standeth : Make only one Hole in it, at the End of the Returne furthest from the *Turret*. Reuerse it, and fill it full of *Oile*, by that Hole ; And then set it vpright againe ; And put a *Wicke* in at the Hole ; And lighten it : You shall finde, that it will burne slow, and a long time. Which is caused, (as was said last before,) for that the *Flame* fetcheth the *Nourishment* a farre off. You shall finde also, that as the *Oile* wasteth, and descendeth, so the Top of the *Turret*, by little and little, filleth with *Aire* ; which is caused by the Rarefaction of the *Oile* by the Heat. It were worthy the Obseruation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almost consumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good also to haue the *Lampe* made, not of *Tinne*, but of *Glasse*, that you may see how the Vapour, or *Aire* gathereth, by degrees, in the Top.

374

A fourth Point, that importeth the *lasting* of the *Flame*, is the Closenesse of the *Aire*, wherein the *Flame* burneth. Wee see, that if *Wind* bloweth vpon a *Candle*, it wasteth apace. We see also, it lasteth longer in a *Lanthorne*, than at large. And there are Traditions of *Lamps*, and *Candles*, that haue burnt a very long time, in *Caves*, and *Tombs*.

375

A Fifth Point, that importeth the *Lasting* of the *Flame*, is the Nature of

of the *Aire*, where the *Flame* burneth ; whether it be Hot or Cold ; Moist or Drie. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burne more fiercely ; (As Fire scorcheth in Frostie weather ;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceiue) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent : The *Aire*, if it be *Moist*, doth in a Degree quench the *Flame* : (As wee see *Lights* will goe out in the *Damps* of *Mines* :) And howsoeuer maketh it burne more dully : And so helpeth the *Continuance*.

Burials in *Earth* serue for *Preseruation* ; And for *Condensation* ; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may burie the *Bodies* so, as *Earth* may touch them : As if you will make *Artificiall Porcellane*, &c. And the like you may doe for *Conseruation*, if the *Bodies* be Hard, and Solid ; As Clay, Wood, &c. But if you intend *Preseruation* of *Bodies*, more Soft and Tender, then you must doe one of these two : Either you must put them in *Cases*, whereby they may not touch the *Earth* ; Or else you must vault the *Earth*, whereby it may hang ouer them, and not touch them ; For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserue them ; Except the *Earth* be very Drie, and Sandie.

An *Orenge*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Fortnights Space, foure Foot deepe within the *Earth*, though it were in a Moist Place, and a Rainie Time, yet came forth, no wayes Mouldie, or Rotten, but were become a little harder than they were ; Otherwise fresh in their Colour ; But their Iuyce somewhat flatted. But with the *Buriall* of a Fortnight more they became Putrified.

A *Bottle* of *Beere*, buried in like manner, as before, became more liuely, better tasted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more liuely, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and liuely, if not better, than before.

It were a profitable *Experiment*, to preserue *Orenges*, *Lemons*, and *Pomgranates*, till Summer ; For then their Price will be mightily increased. This may be done, if you put them in a Pot or Vessell, well couered, that the *Moisture* of the *Earth* come not at them ; Or else by putting them in a *Conseruatorie* of *Snow*. And generally, whosoever will make *Experiments* of *Cold*, let him be prouided of three Things ; A *Conseruatorie* of *Snow* ; A good large *Vault*, twenty foot at least vnder the Ground ; And a *Deepe Well*.

There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that haue lost their Colours, may be reconered by *Burying* in the *Earth* : Which is a thing of great profit, if it would sort : But vpon Triall of Six Weekes *Buriall*, there followed no Effect. It were good to trie it,

Experiments
in Consort
touching *Bu-
rialls* or *Insi-
ons* of diuers
Bodies in *Earth*.

376

377

378

379

380

in a *Deepe Well*; Or in a *Conseruatory of Snow*, where the Cold may be more *Constringent*; And so make the *Body* more vnited, and thereby more *Resplendent*.

Experiment
Solitary, touch-
ing the Af-
fect in Mens
Bodies from Se-
uerall Winds.

381

Mens Bodies are heauier, and lesse disposed to Motion, when *Southerne Winds* blow, than when *Northerne*. The Cause is, for that when the *Southerne Winds* blow, the *Humours* doe (in some Degree) melt, and waxe fluide, and so flow into the Parts; As it is seene in *Wood*, and other *Bodies*; which, when the *Southerne Winds* blow, doe swell. Besides, the Motion and Actiuiy of the Body consisteth chiefly in the *Sinewes*, which, when the *Southerne Wind* bloweth, are more relaxe.

Experiment
Solitary touch-
ing Winter
and Summer
Sicknesses.

382

It is commonly seene, that more are *Sick* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly raigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefly by *Heat*; But then they are Cured most by *Sweat*, and *Purge*; which in the *Summer* commeth on, or is prouoked, more Easily: As for *Pestilent Diseases*, the Reason why most *Dye* of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most Danger in the *Winter*.

Experiment
Solitary touch-
ing Pestilenti-
all Seasons.

383

The Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Vpon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there haue beene great *Plagues* in *Dry Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the *Humours*, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *Waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake vp in the *Summer-moneths*, when the *Weather* is *Hot* and *Dry*.

Experiment
Solitary, touch-
ing an Error
receined about
Epidemicall Dis-
eases.

384

Many *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the Cause is falsely imputed to the *Constitution* of the *Aire*, at that time, when they breake forth, or raigne; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Obseruations, of the *Diseases*, that ensue vpon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment
Solitary, touch-
ing the Alter-
ation or Preser-
uation of Li-
quours in Wells,
or deepe Vaults.

385

Triall hath beene made, with *Earthen Bottles* well stopped, hanged in a *Well* of Twenty Fathome deepe, at the least; And some of the *Bottles* haue beene let downe into the *Water*, some others haue hanged aboue, within about a fathome of the *Water*; And the *Liquours* so tried haue beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Prooffe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as aboue,) haue not beene palled or deaded at all; But

as

as good, or somewhat better, than *Bottles* of the same *Drinks*, and Stale-
ness, kept in a *Cellar*. But those which did hang about *Water*, were ap-
parently the best; And that *Beere* did flower a little; whereas that vnder
Water did not, though it were Fresh. The *Milke* sowed, and began to
Putrifie. Neuerthelesse it is true, that there is a *Village* neare *Blois*, where
in *Deepe Canes* they doe thicken *Milke*; In such sort, that it becommeth
very pleasant; Which was some *Cause* of this Triall of Hanging *Milke*
in the *Well*: But our prooffe was naught; Neither doe I know, whether
that *Milke* in those *Canes*, be first boyled. It were good therefore to try
it with *Milke* Soddin, and with *Creame*; For that *Milke* of it selfe is
such a Compound Body, of *Creame*, *Curds*, and *Whey*, as it is easily Tur-
ned, and Dissolued. It were good also to try the *Beere*, when it is in
Wort, that it may be seene, whether the *Hanging* in the *Well*, will Accele-
rate the *Ripening* and *Clarifying* of it.

Diuers, we see, doe *Stut*. The *Cause* may be, (in most,) the *Refri-*
geration of the *Tongue*; Whereby it is lesse apt to moue. And therefore
we see, that *Naturalls* doe generally *Stut*: And we see that in those that
Stut, if they drinke *Wine* moderately, they *Stut* lesse, because it heateth:
And so we see, that they that *Stut*, doe *Stut* more in the first Offer to
speake, than in Continuance; Because the *Tongue* is, by Motion, some-
what heated. In some also, it may be, (though rarely,) the *Driness* of
the *Tongue*; which likewise maketh it lesse apt to moue, as well as *Cold*;
For it is an Affect that commeth to some *Wise* and *Great Men*; As it did
vnto *Moses*, who was *Lingua prapedita*; And many *Stutters* (we finde)
are very *Cholericke Men*; *Choler* Enducing a *Driness* in the *Tongue*.

Experiment
Solitary, tou-
ching *Stuttering*

386

Smells, and other *Odours*, are Sweeter in the Aire, at some Distance,
than neare the Nose; As hath bene partly touched heretofore. The
Cause is double: First the finer Mixture, or Incorporation of the *Smell*:
For we see that in *Sounds* likewise, they are Sweetest, when we cannot
heare euery Part by it selfe. The other *Reason* is, for that all *Sweet*
Smells haue ioyned with them, some *Earthy* or *Crude Odours*; And at
some distance the *Sweet*, which is the more Spirituall, is Perceiued; And
the *Earthy* reacheth not so farre.

Experiments
in Consort,
touching
Smells.

387

Sweet Smells are most forcible, in *Dry Substances*, when they are
Broken; And so likewise in *Orenges*, or *Lemons*, the Nipping of their
Rinde, giueth out their *Smell* more: And generally, when *Bodies* are
Moued or *Stirred*, though not *Broken*, they *Smell* more; As a Sweet-
Baggewaued. The *Cause* is double: The one, for that there is a *Grea-*
ter Emission of the *Spirit*, when Way is made: And this holdeth in the
Breaking, *Nipping*, or *Crushing*; It holdeth also, (in some Degree) in the
Mouing: But in this last, there is a Concurrence of the Second *Cause*;
Which is the *Impulsion* of the *Aire*, that bringeth the *Sens* faster vp-
on vs.

388

The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaves*
smell

389

smell not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pinckes*, *Wood-bines*, *Vine-flowers*, *Apple-Bloomes*, *Lime-Tree Bloomes*, *Beane-Bloomes*, &c. The Cause is, for that where there is Heat and strength enough in the Plant, to make the *Leaves Odorate*, there the *Smell* of the *Flower* is rather Euanide and Weaker, than that of the *Leaves*; As it is in *Rose-Mary-Flowers*, *Lawender-Flowers*, and *Sweet-Briar-Roses*. But where there is lesse Heat, there the *Spirit* of the *Plant*, is digested and refined, and seuered from the Grosser Iuyce, in the *Efflorescence*, and not before.

390

Most *Odours* smell best, *Broken* or *Crusht*, as hath beene said; But *Flowers Pressed* or *Beaten*, doe lesse the Freshnesse and Sweetnesse of their *Odour*. The Cause is, for that when they are *Crusht*, the Grosser and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in stronger *Odours* there are no such Degrees of the Issue of the *Smell*.

Experiments
in Confort
touching the
Goodnesse and
Choice of Water.

391

It is a Thing of very good Vse, to Discover the *Goodnesse* of *Waters*. The *Taste*, to those that Drinke *Water* onely, doth somewhat: But other *Experiments* are more sure. First, try *Waters* by *Weight*; Wherein you may finde some difference, though not much: And the *Lighter* you may account the Better.

392

Secondly, try them by *Boyling* ypon an *Equall Fire*: And that which consumeth away fastest, you may account the Best.

393

Thirdly, try them in *Seuerall Bottles*, or Open Vessells, Matches in euery Thing else, and see which of them *Last Longest*, without *Stench*, or *Corruption*. And that which holdeth *Vnputrified* longest, you may likewise account the Best.

394

Fourthly, try them by *Making Drinckes* Stronger, or Smaller, with the same *Quantity* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more *Concocted*, and *Nourishing*; though perhaps it be not so good for *Medicinall vse*. And such *Water* (commonly) is the *Water* of *Large* and *Nauigable Rivers*: And likewise in *Large* and *Cleane Ponds* of *Standing water*: For vpon both them, the *Sunne* hath more power, than vpon *Fountaines*, or *Small Rivers*. And I conceiue that *Chalke-water* is next them the best, for going furthest in *Drinke*: For that also helpeth *Concoction*; So it be out of a *Deepe Well*; For then it Cureth the *Rawnesse* of the *Water*; But *Chalkie Water*, towards the *Top* of the *Earth*, is too fretting; As it appeareth in *Laundry* of *Cloaths*, which weare out apace, if you vse such *Waters*.

395

Fifthly, The *Houswiues* doe finde a Difference in *Waters*, for the *Bearing*, or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* best; For the *Hungry water* doth kill the *Vnctuous Nature* of the *Soape*.

396

Sixthly, you may make a Iudgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Rain-Water* is, by the *Physicians*, esteemed the *Finest*, and the best; But yet it is said to putrifie soonest; which is likely, because of the *Finenesse* of the *Spirit*: And in *Conseruatorie*,

seruatories of Raine-water, (such as they haue in *Venice*, &c.) they are found not so *Choice Waters*; The worse, (perhaps,) because they are Couered aloft, and kept from the Sunne. *Snow-water* is held vnwhole-some; In so much as the People; that dwell at the Foot of the *Snow-Mountaines*, or otherwise vpon the Ascent, (especially the Women,) by drinking of *Snow-water*, haue great Bagges hanging vnder their Throats. *Well-water*, except it be vpon *Chalke*, or a very plentiful Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the best: For both they seeme to haue a Lightnesse, and Apperite of Mounting; And besides they are most pure and Vnmingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Valleyes*, ioyne in effect vnder Ground with all *Waters* of the same Leuell; Whereas *Springs*, on the *Tops* of *Hills*, passe thorow a great deale of Pure Earth, with lesse Mixture of other *Waters*.

Seuenthly, Iudgement may be made of *Waters* by the *Soyle where-upon the Water runneth*; As *Pebble* is the Cleanest, and best tasted; And next to that *Clay-water*; And Thirdly, *Water* vpon *Chalke*; Fourthly, that vpon *Sand*; And Worst of all vpon *Mudde*. Neither may you trust *Waters* that Taste Sweet; For they are commonly found in Rising Grounds of great *Cities*; which must needs take in a great deale of Filth.

In *Peru*, and diuers Parts of the *West Indies*, though vnder the *Line*, the *Heats* are not so Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Causes* are, First the Great *Brixes*, which the Motion of the Aire in great Circles, (such as are vnder the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in those Parts Noone is nothing so hot, when the *Brixes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cause* is, for that the Length of the Night, and the Dewes thereof, doe compensate the *Heat* of the Day. A third *Cause* is the Stay of the Sunne; Not in Respect of Day and Night, (for that wee spake of before,) but in Respect of the Season; For vnder the *Line*, the Sunne crosseth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth backe againe, and so maketh one Long Summer.

The *Heat* of the *Sunne* maketh *Men Blacke* in some Countries, as in *Aethiopia*, and *Ginny*, &c. *Fire* doth it not, as wee see in *Glasse-Men*, that are continually about the *Fire*. The *Reason* may be, because *Fire* doth like vp the *Spirits*, and Bloud of the Body, so as they Exhale; So that it euer maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud

to

397

Experiment
Solitary, touching the
Temperate Heat vnder the
Equinoctiall.

398

Experiment
Solitary, touching the
Coloration of Blacke
and Tawney
Moores.

399

to the Outward *Parts*; And rather Concocteth it, than Soaketh it: And therefore wee see that all *Aethiopes* are Flethy, and Plumpe, and haue great Lips; All which betoken *Moisture* retained, and not drawne out. Wee see also, that the *Negroes* are bred in Countries that haue Plenty of *Water*, by *Riuers*, or otherwise: For *Meroë*, which was the *Metropolis* of *Aethiopia*, was vpon a great Lake: And *Congo*, where the *Negroes* are, is full of *Riuers*. And the Confines of the *Riuer Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, in so much as it is pestilent through *Moisture*: But the Countries of the *Abyssenes*, and *Barbary*, and *Pern*, where they are Tawney, and Oliuaster, and Pale, are generally more Sandy, and Dry. As for the *Aethiopes*, as they are Plumpe, and Flethy; So (it may bee) they are Sanguine, and ruddy Coloured, if their blacke Skinne would suffer it to be scene.

Experiment
Solitary touching
Motion
after the Instant
of Death.

400

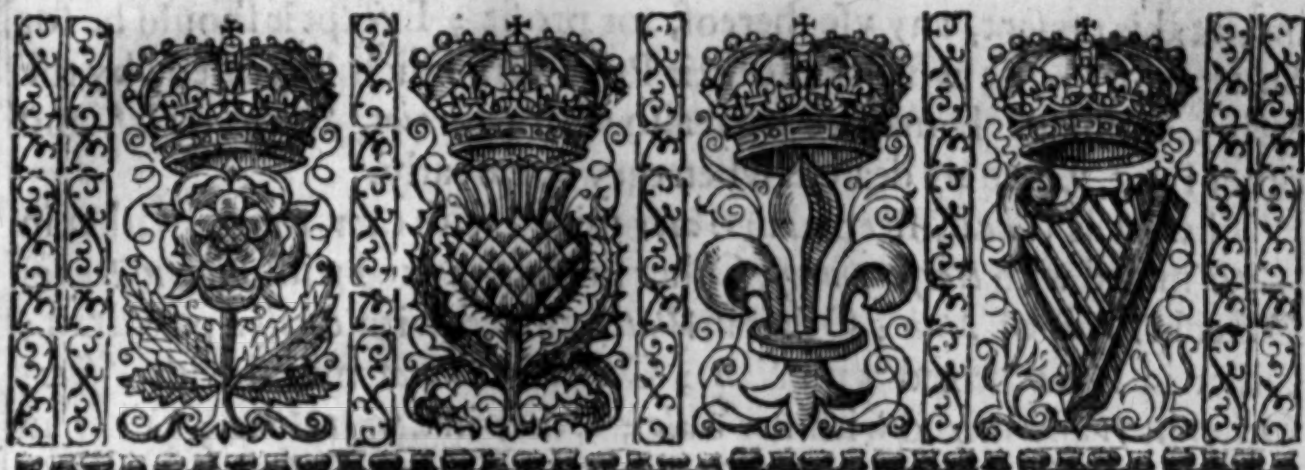
Some *Creatures* doe moue a good while after their Head is off; As *Birds*; Some a very little time; As *Men*, and all beasts; Some moue, though cut in seuerall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of *Death*, is the Resolution or Extinguishment of the *Spirits*; And that the Destruction or Corruption of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the Extinguishment of the *Spirits* doth speedily follow; But yet so, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the Heart hath beene seuered; And it is a Report also of Credit, that the Head of a *Pigge* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or seuering it from the Marrow of the Back-bone; During which time the *Pigge* hath beene, in all appearance, starke dead, and without Motion; And after a small Time the Braine hath beene replaced, and the Skull of the *Pigge* closed, and the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* vpon *Reuenge* hath beene thrust forth, so as it hanged a pretty distance by the *Visuall Nerue*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beasts* are Large; And therefore, when the *Head* is off, they moue little or Nothing. But *Birds* haue small *Heads*, and therefore the *Spirits* are a little more dispersed in the *Sinewes*, whereby Motion remaineth in them a little longer; In so much as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did Shoote a great Forked Arrow at an *Estrich*, as shee ranne swiftly vpon the Stage, and stooke off her Head; And

And yet shee continued the Race, a little way, with the Head off.
As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused almost all over ; And therefore they moue in their Seuerall Pieces.

P

NATV.

And as they continued on their way, with the Head of
As for Henry, and John, and Mary, the story is
most all over; And the story is most in
then, the story is most in



NATVRALL HISTORIE.

V. Century.



E will now enquire of *Plants* or *Vegetables*: And we shall doe it with diligence. They are the principall Part of the *Third Dayes Worke*. They are the first *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Essence*; And they are of excellent and generall Use,

for Food, Medicine, and a Number of Mechanicall Arts.

There were sown in a *Bed*, *Turnip-Seed*, *Radish-Seed*, *Wheat*, *Cucumber-Seed*, and *Pease*. The *Bed* we call a *Hot-Bed*, and the Manner of it is this. There was taken *Horse-dung*, old, and well rotted; This was laid vpon a Banke, halfe a foot high, and supported round about with Planks; And vpon the Top was cast Sifted Earth, some two Fingers deepe; And then the *Seed* sprinkled vpon it, hauing beene steeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came vp halfe an Inch aboue Ground, within two dayes after, without any *Waiting*. The Rest the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would haue beene the speedier. This is a Noble *Experiment*; For without this helpe, they would haue

Experiments
in Confort,
touching the
Acceleration of
Germination.

= 401

beene foure times as long in comming vp. But there doth not occurre to me, at this present, any vse thereof, for profit ; Except it should be for Sowing of *Pease* ; which haue their Price very much increased, by the early Comming. It may be tried also with *Cherries*, *Strawberries*, and other Fruit, which are dearest, when they come early.

402 There was *Wheat*, steeped in *Water* mixed with *Cow-Dung* ; Other in *Water* mixed with *Horse-Dung* ; Other in *Water* mixed with *Pigeon-Dung* ; Other in *Urine* of *Man* ; Other in *Water* mixed with *Chalke* powdered ; Other in *Water* mixed with *Soot* ; Other in *Water* mixed with *Ashes* ; Other in *Water* mixed with *Bay-Salt* ; Other in *Claret Wine* ; Other in *Malmsey* ; Other in *Spirit of Wine*. The Proportion of the Mixture was, a fourth Part of the Ingredients to the *Water* ; Saue that there was not of the *Salt* aboue an eighth Part. The *Urine*, and *Wines*, and *Spirit of Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelue houres. The Time of the Yeare *October*. There was also other *Wheat* sown vnsteeped, but watered twice a day with *Warme water*. There was also other *Wheat* sown Simple to compare it with the rest. The Euent was ; That those that were in the Mixture of *Dung*, and *Urine*, and *Soot*, *Chalke*, *Ashes*, and *Salt*, came vp within six dayes : And those that afterwards proued the Highest, Thickest, and most Lustie, were ; First the *Urine* ; And then the *Dungs* ; Next the *Chalke* ; Next the *Soot* ; Next the *Ashes* ; Next the *Salt* ; Next the *Wheat* Simple of it selfe, vnsteeped, and vnwatered ; Next the *Watered twice a day* with warme water ; Next the *Claret Wine*. So that these three last were slower than the ordinary *Wheat* of it selfe ; And this Culture did rather retard, than aduance. As for those that were steeped in *Malmsey*, and *Spirit of Wine*, they came not vp at all. This is a Rich Experiment for Profit ; For the most of the Steepings are Cheape Things ; And the Goodnesse of the Crop is a great Matter of Gaine ; If the Goodnesse of the Crop answer the Earlinesse of the Comming vp : As it is like it will ; Both being from the vigour of the Seed ; Which also partly appeared in the Former Experiments, as hath beene said. This Experiment would be tried in other Graines, Seeds, and Kernells : For it may be some Steeping will agree best with some Seeds. It would be tried also with *Roots* steeped as before, but for longer time. It would be tried also in Senerall Seasons of the Yeare, especially the Spring.

403 *Strawberries* watered now and then, (as once in three dayes,) with *Water*, wherein hath beene steeped *Sheepes-dung*, or *Pigeons-dung*, will preuent and come early. And it is like, the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an Experiment ; though vulgar in *Strawberries*, yet not brought into vse generally : For it is vsuall to helpe the Ground with *Mucke* ; And likewise to Recomfort it sometimes with *Mucke* put to the *Roots* ; But to water it with *Mucke water*, which is like to be more Forcible, is not practised.

404 *Dung*, or *Chalke*, or *Blond*, applied in Substance, (seasonably,) to the Roots

Roots of Trees, doth set them forwards. But to doe it vnto *Herbs*, without Mixture of *Water* or *Earth*, it may be these Helpes are too Hot.

The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the *Nourishment* better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the experiments that follow; Though they be not Applications to the *Root*, or *Seed*. The *Planting* of *Trees* warme vpon a *Wall*, against the South, or South-East Sunne, doth hasten their Comming on, and Ripening; And the South-East is found to be better than the South-West, though the South-West be the Hotter Coast. But the cause is chiefly, for that the Heat of the Morning succeedeth the Cold of the Night; and partly, because (many times) the South-west Sunne is too Parching. So likewise the *Planting* of them vpon the *Backe* of a *Chimney*, where a *Fire* is kept, doth hasten their Comming on, and Ripening: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a *Fire* is continually kept, worketh the same Effect; Which hath beene tried with *Grapes*; In so much as they will come a Moneth earlier, than the *Grapes* abroad.

Besides the two *Meanes* of *Accelerating Germination*, formerly described, That is to say, the *Mending* of the *Nourishment*; and *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making way* for the *Easie Comming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Remouing Herbs* and *Flowers* into new *Earth*, once in two yeares, (which is the same thing, For the new *Earth* is euer looser,) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*.

But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske Rose* with the *Root* on, was set in a Chamber, where no *Fire* was, vpright in an *Earthen Pan*, full of *Faire Water*, without any Mixture, halfe a foot vnder the *Water*, the *Standard* being more then two foot high aboue the *Water*: Within the Space of ten dayes, the *Standard* did put forth a faire Greene leafe, and some other little Buds, which stood at a stay, without any Shew of decay or withering, more then seven Daies. But afterwards that *Leafe* faded, but the young Buds did sprout on; which afterward opened into faire *Leaues*, in the space of three Moneths; And continued so a while after, till vpon Remouall wee left the *Triall*. But note that the *Leaues* were somewhat paler, and lighter-coloured, than the *Leaues* vse to be abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would haue put forth with greater strength, and (it may be) to haue growne on to beare *Flowers*. By this *Meanes*, you may haue, (as it seemeth,) *Roses* set in the midst of a *Pool*, being supported with some stay; Which is Matter of Rarenesse and Pleasure, though of small Vse. This is the more strange,

405

406

407

strange, for that the like *Rose-standard* was put, at the same time, into *Water* mixed with *Horse-dung*, the *Horse-dung* about the fourth Part to the *Water*, and in foure Moneths space (while it was obserued) put not forth any *Leafe*, though diuers *Buds* at the first, as the other.

408

A *Dutch Flower*, that had a *Bulbous Root*, was likewise put, at the same time, all vnder *Water*, some two or three Fingers deepe; And within seuen dayes sprouted, and continued long after, further Growing. There were also put in, a *Beet-Root*, a *Borage-Root*, and a *Raddish-Root*, which had al their *Leaves* cut almost close to the *Roots*; And within six weekes had faire *Leaves*; And so continued, till the end of *November*.

409

Note that if *Roots*, or *Pease*, or *Flowers*, may be *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that those Things beare when they come early: The other in the *Swiftnesse* of their *Returns*: For in some Grounds which are strong, you shall haue a *Raddish*, &c. come in a Month; That in other Grounds will not come in two; And so make double *Returns*.

410

Wheat also was put into the *Water*, and came not forth at all; So as it seemeth there must be some Strength and Bulke in the Body, put into the *Water*, as it is in *Roots*; For *Graines*, or *Seeds*, the Cold of the *Water* will mortifie. But casually some *Wheat* lay vnder the Pan, which was somewhat moistned by the Suing of the Pan; which in six weekes (as aforesaid) looked mouldy to the Eye, but it was sprouted forth halfe a Fingers length.

411

It seemeth by these *Instances* of *Water*, that for Nourishment, the *Water* is almost all in all, and that the *Earth* doth but keepe the *Plant* vp-right, and saue it from Ouer-heat, and Ouer-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proueth also that our former *Opinion*; That *Drinke* incorporate with *Flesh*, or *Roots*, (as in *Capon-Beere*, &c.) will nourish more easily, than *Meat* and *Drinke* taken seuerally.

412

The *Housing* of *Plants* (I conceiue) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seasons*: And as wee *House* *Hot-Country* *Plants*, as *Lemons*, *Orenge*s, *Myrtles*, to saue them; So we may *House* our owne *Country* *Plants*, to forward them, and make them come in the Cold Seasons; In such sort, that you may haue *Violets*, *Strawberries*, *Pease*, all *Winter*: So that you sow, or remoue them at fit times. This *Experiment* is to be referred vnto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Housing* their *Boughes*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments
in Conseru,
touching the
Putting backe or
Retardation of
Germination.

413

To make *Roses*, or other *Flowers* come late, it is an *Experiment* of Pleasure. For the Ancients esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, hauing beene lesse exhaled by the Sunne. The *Meanes* are these. First, the *Cutting off their Tops*, immediately after they haue done Bearing; And then they will come againe the

the same yeare about *November*: But they will not come iust on the Tops, where they were cut, but out of those Shoots, which were, (as it were,) *Water-Boughes*. The *Cause* is, for that the Sap, which otherwise would haue fed the Top, (though after Bearing,) will, by the discharge of that, diuert vnto the Side-Sprouts; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Rose*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cause* is the same with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the same Effect, in Retention of the Sap for a time, and Diuersion of it to the Sprouts, that were not so forward.

The Third is the *Cutting off some few of the Top-Boughes* in the *Spring-time*, but suffering the lower Boughes to grow on. The *Cause* is, for that the Boughes doe helpe to draw vp the Sap more strongly; And we see that in Powling of Trees, many doe vse to leaue a Bough or two on the Top, to helpe to draw vp the Sap. And it is reported also, that if you graft vpon the Bough of a Tree, and cut off some of the old Boughes, the new Cions will perish.

The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The *Cause* is plaine, for that it doth arrest the Sap, from going vpwards, for a time; Which Arrest is afterwards released by the Couering of the Root againe with Earth; And then the Sap getteth vp, but later.

The Fifth is the *Remouing of the Tree*, some Moneth before it *Buddeth*. The *Cause* is, for that some time will be required after the *Remoue*, for the Resetling, before it can draw the Iuyce: And that time being lost, the Blossome must needs come forth later.

The Sixth is the *Grafting of Roses in May*, which commonly Gardiners doe not till *Iuly*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the same yeare, but late.

The Seuenth is, the *Girding of the Body of the Tree* about with some Pack-threed; For that also, in a degree, restraineth the Sap, and maketh it come vp, more late, and more Slowly.

The Eighth is, the *Planting of them in a Shade*, or in a *Hedge*; The *Cause* is, partly the Keeping out of the Sunne, which hasteneth the Sap to rise; And partly the Robbing of them of Nourishment, by the Stuffle in the *Hedge*. These Meanes may be practised vpon other, both Trees, and Flowers, *Mutatis Mutandis*.

Men haue entertained a Conceit that sheweth prettily; Namely, that if you graft a *Late-Coming Fruit*, vpon a Stocke of a *Fruit-tree* that *Commeth early*, the Graft will beare *Fruit Early*; As a Peach vpon a Cherry; And contrariwise, if an *Early-Coming-Fruit* vpon a Stocke of a *Fruit-Tree* that *Commeth late*, the Graft will beare *Fruit late*; As a Cherry vpon a Peach. But these are but Imaginations, and vntrue. The *Cause* is, for that the Cions ouerruleth the Stocke quite; And the Stocke is but Passiue onely, and giueth Aliment, but no Motion to the Graft.

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Experiments
in Confort
touching the
Melioration of
Fruits, Trees,
and Plants.

We will speake now, how to make *Fruits, Flowers,* and *Roots* larger; in more plenty; and sweeter; than they vse to be; And how to make the *Trees* themselves, more Tall; more Spread; and more Hasty and Sudden; than they vse to be. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will serue much to these Purposes. And againe, that these *Experiments*, which we shall now set downe, doe serue also for *Acceleration*; because both Effects proceed from the Encrease of vigour in the Tree; But yet to auoid Confusion; And because some of the Meanes are more proper for the one Effect, and some for the other, wee will handle them apart.

422 It is an assured Experience, that an *Heape* of *Flint*, or *Stone*, laid about the *Bottom* of a *Wilde-Tree*, (as an *Oake*, *Elme*, *Ash*, &c.) vpon the first Planting, doth make it prosper double as much, as without it. The *Cause* is, for that it retaineth the *Moisture*, which falleth at any time vpon the *Tree*, and suffereth it not to be exhaled by the *Sunne*. Again, it keepeth the *Tree* warme, from *Cold Blasts* and *Frosts*, as it were in an *House*. It may be also, there is somewhat in the Keeping of it steady at the first. *Quare*, if Laying of *Straw* some Height about the *Body* of a *Tree*, will not make the *Tree* forwards. For though the *Root* giueth the *Sap*, yet it is the *Body* that draweth it. But you must note, that if you lay *Stones* about the *stalke* of *Lettuce*, or other *Plants*, that are more soft, it will ouer-moisten the *Roots*, so as the *Wormes* will eat them.

423 A *Tree*, at the first *Setting*, should not be *Shaken*, vntill it hath taken *Root* fully: And therefore some haue put two little *Forkes* about the *Bottom* of their *Trees*, to keepe them vpright; But after a yeares *Rooting*, then *Shaking* doth the *Tree* good, by *Loosening* of the *Earth*, and (perhaps) by *Exercising* (as it were) and *Stirring* the *Sap* of the *Tree*.

424 Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Body*, doth make *Trees* grow high; And contrariwise, the *Powling* and *Cutting* of the *Top*, maketh them grow spread, and bushy. As wee see in *Pollards*, &c.

425 It is reported, that to make *hasty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of some seuen yeares growth; And to set them, not vpright, but a-slope, a reasonable depth vnder the *Ground*; And then, in stead of one *Root*, they will put forth many, and so carry more *Shoots* vpon a *Stemme*.

426 When you would haue many new *Roots* of *Fruit-trees*, take a *Low Tree*, and bow it, and lay all his *Branches* a-flat vpon the *Ground*, and cast *Earth* vpon them; And euery *Twigg* will take *Root*. And this is a very profitable *Experiment* for *Costly Trees*, (for the *Boughes* will make *Stockes*;

Stockes without charge;) Such as are *Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs, &c.* The like is continually practised with *Vines, Roses, Muske-Roses, &c.*

From *May* to *July* you may take off the *Barke* of any *Bough*, being of the Bignesse of three or foure Inches, and couer the bare Place, somewhat aboue, and below, with Loame well tempered with Horse-dung, binding it fast downe. Then cut off the *Bough* about *Albionside* in the bare place, and set it in the Ground; And it will grow to be a faire *Tree* in one Yeare. The *Cause* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from descending towards Winter, and so holdeth it in the *Bough*; And it may be also that the Loame and Horse-Dung applied to the bare place, doe moisten it, and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping vp the *Sap* of *Trees* in their *Boughes*; Which may serue to other Effects.

It hath beene practised in *Trees*, that shew faire, and beare not, to Bore a Hole thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be for that the *Tree* before had too much *Repletion*, and was oppressed with his owne *Sap*; For *Repletion* is an Enemy to Generation.

It hath beene practised in *Trees*, that doe not beare, to cleaue two or three of the *Chiete* Roots, and to put into the Cleft a small Pebble, which may keepe it open, and then it will beare. The *Cause* may be, for that a Root of a *Tree* may be (as it were,) Hide-bound, no lesse than the Body of the *Tree*; But it will not keepe open without somewhat put into it.

It is vsually practised, to set *Trees* that require much *Sunne*, vpon *Walls* against the *South*; As *Apricots, Peaches, Plums, Vines, Figs*, and the like. It hath a double Commodity; The one, the *Heat* of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the vpper *Boughes* ouer-shadow the lower; But when it is spread vpon a *Wall*, the *Sunne* commeth alike, vpon the vpper, and lower *Branches*.

It hath also beene practised (by some) to pull off some *Leaues* from the *Trees* so spread, that the *Sunne* may come vpon the *Bough* and *Fruit* the better. There hath beene practised also a Curiosity, to set a *Tree* vpon the *North-Side* of a *Wall*, and at a little height, to draw him thorow the *Wall*, and spread him vpon the *South-Side*: Conceiuing that the Root and lower Part of the Stocke should enioy the Freshnesse of the *Shade*; And the Vpper *Boughes*, and *Fruit*, the Comfort of the *Sunne*. But it sorted not; The *Cause* is, for that the Root requireth some Comfort from the *Sunne*, though vnder Earth, as well as the *Body*: And the Lower Part of the *Body* more than the Vpper, as wee see in *Compassing* a *Tree* below with *Straw*.

The Lownesse of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you shall euer see in *Apricots, Peaches,*

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Peaches, or *Melo-Cotones*, vpon a wall, the greatest Fruits towards the Botto^m. And in *France* the *Grapes* that make the *Wine*, grow vpon low Vines, bound to small Stakes. And the raised Vines in Arbours make but Verityce. It is true, that in *Italy*, and other *Countries*, where they haue hotter Sunne, they raise them vpon *Elmes*, and Trees; But I conceiue, that if the *French* Manner of Planting low, were brought in vs^e there, their *Wines* would be stronger and sweeter. But it is more chargeable in respect of the Props. It were good to try whether a Tree grafted somewhat neare the Ground, and the lower boughes onely maintained, and the higher continually pruned off, would not make a larger Fruit.

433 To haue Fruit in Greater Plenty, the way is, to graft, not onely vpon young Stockes, but vpon diuers Boughes of an old Tree; for they will beare great Numbers of Fruit; VVhereas if you graft but vpon one Stocke, the Tree can beare but few.

434 The Digging yearely about the Roots of Trees, which is a great means, both to the Acceleration and Melioration of Fruits, is practised in nothing but in Vines; VVhich if it were transferred vnto other Trees, and Shrubs, (as *Roses*, &c.) I conceiue would aduance them likewise.

435 It hath beene knowne, that a Fruit-Tree hath beene blowne vp (almost) by the Roots, and set vp againe, and the next yeare bare exceedingly. The Cause of this, was nothing but the Loosening of the Earth, which comforteth any Tree, and is fit to be practised, more than it is, in Fruit-Trees. For Trees cannot be so fitly remoued into New Grounds, as Flowers and Herbs may.

436 To reuiue an Old Tree, the Digging of it about the Roots, and Applying new Mould to the Roots, is the way. VVe see also that Draught-Oxen, put into fresh Pasture, gather new and tender Flesh; And in all Things, better Nourishment than hath beene vsed, doth helpe to renew; Especially, if it be not onely better, but changed, and differing from the former.

437 If an Herbe be cut off from the Roots, in the beginning of Winter, and then the Earth be troden and beaten downe hard, with the Foot and Spade, the Roots will become of very great Magnitude in Summer. The Reason is, for that the Moisture being forbidden to come vp in the Plant, stayeth longer in the Root, and so dilateth it. And Gardiners vse to tread downe any loose Ground, after they haue sowne Onions, or Turnips, &c.

438 If *Panicum* be laid below, and about the Botto^m of a Root, it will cause the Root to grow to an Excessive Bignesse. The Cause is, for that being it selfe of a Spungy Substance, it draweth the Moisture of the Earth to it, and so feedeth the Root. This is of greatest vs^e for Onions, Turnips, Parsnips, and Carrots.

439 The Shifting of Ground is a Meanes to better the Tree, and Fruit. But with this Caution, That all Things doe prosper best, when they are aduanced to the better. Your Nursery of Stockes ought to be in a more Barren

Barren Ground, than the Ground is whereunto you remoue them. So all *Grassiers* preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it lea-
ueth a Cherishing to the better, of the Body, in Age : Nay in Exer-
cises, it is good to begin with the hardest, as Dancing in Thicke
Shooes, &c.

It hath beene obserued, that *Hacking* of *Trees* in their *Barke*, both
downe-right, and acrosse, so as you make them rather in slices, than
in continued Hacks, doth great good to *Trees*; And especially deliue-
reth them from being *Hide-bound*, and killeth their *Mosse*.

Shade to some *Plants* conduceth to make them large, and prosperous,
more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst
Strawberries, sow here and there some *Borage-Seed*; And you shall
finde the *Strawberries* vnder those *Leaues* farre more large than their
Fellowes. And *Bayes* you must plant to the *North*; Or defend them
from the *Sunne* by a Hedge-Row; And when you sow the *Berries*, weed
not the *Borders*, for the first halfe yeare; For the *Weed* giueth them
Shade.

To increase the *Crops* of *Plants*, there would be considered, not only
the *Increasing* the *Lust* of the *Earth*, or of the *Plant*, but the *Sauing* also
of that which is spilt. So they haue lately made a *Triall*, to *Set Wheat*;
which neuerthelesse hath beene left off, because of the trouble and
paines; Yet so much is true, that there is much saued by the *Setting*, in
comparison of that which is *Sowen*; Both by keeping it from being
picked vp by *Birds*; And by Auoiding the Shallow lying of it, where-
by much that is sown taketh no Root.

It is prescribed by some of the *Ancients*, that you take *Small Trees*,
vpon which *Figs* or other *Fruit* grow, being yet vnripe, and couer the
Trees in the Middle of *Autumne* with dung, vntill the Spring; And
then take them vp in a warme day, and replant them in good Ground;
And by that meanes, the former yeares *Tree* will be ripe, as by a new
Birth; when other *Trees* of the same kinde, doe but blossome. But this
seemeth to haue no great Probabilitie.

It is reported, that if you take *Nitre*, and mingle it with *Water*, to the
thicknesse of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut,
it will sprout forth within eight dayes. The *Cause* is like to be, (if the
Experiment be true,) the Opening of the *Bud*, and of the Parts Contigu-
ous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of
Vegetables.

Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Oranges*; Or a *Peach*, or a
Plum-Stone, &c. And put them into a *Squill*, (which is like a great
Onion,) and they will come vp much earlier than in the *Earth* it selfe.
This I conceiue to be as a Kinde of *Grafting* in the *Root*; For as the
Stock of a *Graft* yeeldeth better prepared Nourishment to the *Graft*,
than the Crude *Earth*; So the *Squill* doth the like to the *Seed*. And I
suppose the same would be done, by Putting *Kernells* into a *Turnip*, or

the like ; Saue that the *Squill* is more Vigorous, and Hot. It may be tried also, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in seuerall places, when it is almost at his Bignesse, and before it ripeneth, hath beene practised with successe, to ripen the *Fruit* more suddenly. Wee see the Example of the *Biting* of *Wasps*, or *Wormes*, vpon *Fruit*, whereby it (manifestly) ripeneth the sooner.

447 It is reported, that *Alga Marina* (*Sea-weed*) put vnder the *Roots* of *Coleworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertilitie.

448 It hath beene practised, to cut off the *Stalkes* of *Cucumbers*, immediately after their *Bearing*, close by the Earth ; And then to cast a prettie Quantitie of Earth vpon the *Plant* that remaineth ; and they will beare the next yeare *Fruit*, long before the ordinary time. The *Cause* may be, for that the Sap goeth downe the sooner, and is not spent in the *Stalke* or *Leafe*, which remaineth after the *Fruit*. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annuall*, seemeth to be partly caused by the Ouer-Expence of the Sap into *Stalke*, and *Leaues* ; which being preuented, they will super-annate, if they stand warme.

449 The *Pulling off* many of the *Blossomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cause* is manifest ; For that the Sap hath the lesse to nourish. And it is a Common Experience, that if you doe not pull off some *Blossomes*, the first time a *Tree* bloometh, it will blossome it selfe to death.

450 It were good to trie, what would be the Effect, if all the *Blossomes* were pulled from a *Fruit-Tree* ; Or the *Acornes* and *Chestnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I suppose that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit* ; Or else, the same yeares, larger *Leaues*, because of the Sap stored vp.

451 It hath beene generally receiued, that a *Plant watered* with *Warme Water*, will come vp sooner and better, than with *Cold Water*, or with *Showers*. But our *Experiment* of *Watering Wheat* with *Warme Water* (as hath beene said) succeeded not ; which may be, because the *Triall* was too late in the Yeare, viz. in the End of *October*. For the *Cold* then comming vpon the *Seed*, after it was made more tender by the *Warme Water*, might checke it.

452 There is no doubt, but that *Grafting* (for the most Part) doth meliorate the *Fruit*. The *Cause* is manifest ; For that the Nourishment is better prepared in the *Stock*, than in the *Crude Earth* : But yet note well, that there be some *Trees*, that are said to come vp more happily from the *Kernell*, than from the *Graft* ; As the *Peach*, and *Melocotone*. The *Cause* I suppose to be, for that those *Plants* require a Nourishment of great Moisture ; And though the Nourishment of the *Stock* be finer, and

and better prepared, yet it is not so moist, and plentifully, as the Nourishment of the *Earth*. And indeed we see those *Fruits* are very Cold *Fruits* in their Nature.

It hath beene received, that a Smaller *Peare*, grafted vpon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* vpon the *Late Stocke*; And *à conuerso*; which we reiected before: For the *Cions* will gouerne. Neuerthelesse it is probable enough, that if you can get a *Cions* to grow vpon a *Stocke* of another kinde, that is much moister than his owne *Stocke*, it may make the *Fruit* Greater, because it will yeeld more plentifully nourishment; Though it is like it will make the *Fruit* Baser. But generally, the *Grafting* is vpon a dryer *Stock*; As the *Apple* vpon a *Crab*; The *Peare* vpon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* vpon the *Stocke* of a *Colewort*, and it will beare a great flaggy *Apple*; The *Kernell* of which, if it be set, will be a *Colewort*, and not an *Apple*. It were good to try, whether an *Apple-Cions* will prosper, if it be grafted vpon a *Sallow*, or vpon a *Poplar*, or vpon an *Alder*, or vpon an *Elme*, or vpon an *Horse-Plumme*, which are the moistest of *Trees*. I haue heard that it hath beene tryed vpon an *Elme*, and succeeded.

It is manifest by Experience, that *Flowers* Remoued wax greater, because the Nourishment is more easily come by, in the loose *Earth*. It may be, that Oft Regrafting of the same *Cions*, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it vpon a *Stocke* the first yeare; And then cut it off, and graft it vpon another *Stocke* the second yeare; and so for a third; Or fourth yeare; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting there are many Experiments worth the Noting, but those we reserve to a proper Place.

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaues, haue his *Top* cut off. The Cause is plaine, for that the *Sap* hath the lesse to feed, and the lesse way to mount: But it may be, the *Figge* will come somewhat later, as was formerly touched. The same may be tried likewise in other *Trees*.

It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Truncke* of the *Tree* thorow, in seuerall places, and thrust into the Places bored, Wedges of some Hot *Trees*, as *Turpentine*, *Mastick-Tree*, *Guaiacum*, *Iuniper*, &c. The Cause may be, for that *Aduentiue Heat* doth cheare vp the *Natiue Iuyce* of the *Tree*.

It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Sale*, or *Lees* of *Wine*, or *Blond* to the *Root*. The Cause may be the Encreasing the Lust or Spirit of the *Root*; These Things being more forcible, than ordinary *Composts*.

It is reported by one of the Ancients, that *Artichokes* will be lesse prickly, and more tender, if the *Seeds* haue their *Tops* dulled, or grafted off vpon a *Stone*.

459

Herbes will be tenderer, and fairer; if you take them out of *Beds*, when they are newly come vp, and remoue them into *Pots*, with better *Earth*. The Remoue from *Bed* to *Bed* was spoken of before; But that was in seuerall yeares; This is vpon the sudden. The *Cause* is the same with other *Remones*, formerly mentioned.

460

Coleworts are reported by one of the *Ancients*, to prosper exceedingly, and to be better tasted, if they be sometimes watred with *Salt-Water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is lesse Adurent than *Salt*.

461

It is reported, that *Cucumbers* will proue more Tender, and Dainry, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cause* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the grosser Iuyce of the *Earth*, but onely the finer. The same *Experiment* may be made in *Artichokes*, and other *Seeds*, when you would take away, either their *Flashinesse*, or *Bitternesse*. They speake also, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that seemeth to me not so probable, because *Honey* hath too quicke a Spirit.

462

It is reported that *Cucumbers* will be lesse Watry, and more *Melon-like*, if in the Pit where you set them, you fill it (halfe way vp) with *Chaffe*, or small *Stickes*, and then powre *Earth* vpon them; For *Cucumbers*, as it seemeth, doe extremely affect *Moisture*; And ouer-drinke themselves; Which this *Chaffe*, or *Chips*, forbiddeth. Nay it is further reported, that if when a *Cucumber* is growne, you set a Pot of water about five or six inches distance from it, it will, in 24. houres, shoot so much out, as to touch the Pot; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it discovereth *Perception* in *Plants*, to moue towards that which should helpe and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is far more strange: It is, that if you set a Stake, or Prop, some distance from it, it will grow that way; Which is farre stranger (as is said) than the other; For that *Water* may worke by a *Sympathy* of *Attraction*: But this of the *Stake* seemeth to be a Reasonable Discourse.

463

It hath beene touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receiue Aliment sufficient; And yet no more than they can well turne, and digest; And withall doe sweat out the coursest and vnprofitablest Iuyce; Euen as it is in *Living Creatures*, which by Moderate Feeding, and Exercise, and Sweat, attaine the soundest Habite of Body.

464

As *Terebration* doth *Meliorate Fruit*, so, vpon the like reason, doth *Letting* of *Plants* *Bloud*; As *Pricking Vines*, or other *Trees*, after they be of some Growth; And thereby letting forth *Gumme*, or *Teares*; Though this be not to continue, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, *Bitter Almonds* haue beene turned into *Sweet*.

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The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-Dung* aboue all other *Dung*; Which may be, because of the Moisture of that Beast, whereby the *Excrement* hath lesse Acrimony; For wee see *Swines* and *Pigges* *Flesh* is the Moistest of *Fleashes*.

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It is obserued by some, that all *Herbs* wax sweeter, both in Smell and Taste, if after they be growne vp some reasonable time, they be cut, and so you take the latter Sprout. The Cause may be, for that the longer the Iuyce stayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Causes, why *Graines*, *Seeds*, and *Fruits*, are more Nourishing than *Leaves*, is the Length of time, in which they grow to *Maturation*. It were not amisse to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing.

466

As *Grafting* doth generally aduance and *Meliorate Fruits*, aboue that which they would be, if they were set of *Kernells*, or *Stones*, in regard the *Nourishment* is better concocted; So (no doubt) euen in *Grafting*, for the same cause, the Choise of the *Stocke* doth much; Alwayes provided, that it be somewhat inferiour to the *Cions*: For otherwise it dul- leth it. They commend much the *Grafting* of *Peares*, or *Apples*, vpon a *Quince*.

467

Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tryed, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (especially laid vp together for a Moneth to rot,) is a very great Nourisher, and Comforter to a *Fruit-Tree*.

468

It is deliuered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twenty dayes, and then set againe; And yet more, if the outermost *Pill* be taken off all ouer.

469

It is deliuered by some, that if one take the *Bough* of a *Low Fruit-tree*, newly budded, and draw it gently, without hurting it, into an *Earthen Pot* perforate at the bottome to let in the *Plant*, and then Couer the *Pot* with Earth, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Remouing, and Leauing the *Fruit* in the Earth. The like, (they say,) will be effected, by an *Empty Pot* without Earth in it, put ouer a *Fruit*, being propped vp with a *Stake*, as it hangeth vpon the *Tree*; And the better, if some few *Pertusions* be made in the *Pot*. Wherein, besides the *Defending* of the *Fruit*, from Extremity of Sunne or Weather, some giue a reason, that the *Fruit*, Louing and Couering the open Aire and Sunne, is inuited by those *Pertusions*, to spread and approach, as neare the open Aire, as it can; And so enlargeth in *Magnitude*.

470

All *Trees*, in *High* and *Sandy Grounds*, are to be set deepe; And in *Watry Grounds*, more shallow. And in all *Trees*, when they be remoued (especially *Fruit-Trees*) care ought to be taken, that the *Sides* of the *Trees* be coated, (*North* and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that seemeth

471

seemeth to haue lesse reason; Because the *Stone* lyeth not so neare the *Sunne*, as the *Tree* groweth.

472

Timber Trees in a *Coppies Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot vp still in Height; And chiefly because they are defended from too much *Sun* and *Wind*, which doe checke the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set vpon a *Wall*, against the *Sunne*, betweene *Elbowes* or *Buttresses* of *Stone*, ripen more, than vpon a *Plaine Wall*.

473

It is said, that if *Potato Roots*, be set in a *Pot* filled with *Earth*, and then the *Pot* with *Earth* be set likewise within the *Ground*, some two or three *Inches*, the *Roots* will grow greater, than *Ordinary*. The *Cause* may be, for that Hauing *Earth* enough within the *Pot* to nourish them; And then being stopped by the *Bottom* of the *Pot* from putting *Strings* downward, they must needs grow greater in *Breadth*, and *Thicknesse*. And it may be, that all *Seeds* or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

474

The Cutting off the *Leaves* of *Radish*, or other *Roots*, in the beginning of *Winter*, before they wither; And Couering againe the *Root*, something high with *Earth*; Will preserue the *Root* all *Winter*, and make it bigger, in the *Spring* following, as hath beene partly touched before. So that there is a double Vse of this Cutting off the *Leaves*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthening the *Root*, it will make the *Fruit* also the greater.

475

It is an *Experiment* of great pleasure, to make the *Leaves* of *Shady Trees*, larger than ordinary. It hath beene tryed (for certaine) that a *Cion* of a *Weech-Elme*, grafted vpon the *Stocke* of an *Ordinary Elme*, will put forth *Leaves*, almost as broad as the *Brimme* of ones *Hat*. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaves*. It would be tryed therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the *Leafe*.

476

The *Barrennesse* of *Trees*, by *Accident*, (besides the *Weaknesse* of the *Soile*, *Seed*, or *Root*; And the *Injury* of the *Weather*) commeth either of their *Over-growing* with *Masse*; Or their being *Hide-bound*; Or their *Planting* too deepe; Or by *Issuing* of the *Sap* too much into the *Leaves*. For all these there are *Remedies* mentioned before.

Wee see that in *Living Creatures*, that haue *Male* and *Female*, there is *Copulation* of seuerall *Kindes*; And so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Ass*; And some other *Compounds*, which we call *Monsters*,

sters, though more rare : And it is held, that that *Proverbe*, *Africa semper aliquid Monstri parit* ; commeth, for that the Fountaines of Waters there, being rare, diuers Sorts of Beasts come from seuerall Parts to drinke ; And so being refreshed, fall to couple, and many times with seuerall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out ; Which neuerthelesse, if it be possible, is more at command, than that of *living Creatures* ; For that their Lust requireth a voluntary Motion : wherefore it were One of the most Noble *Experiments* touching *Plants*, to finde it out : For so you may haue great Varietie of New *Fruits*, and *Flowers* yet vknowne. *Grafting* doth it not : That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kinde*. For the *Cions* euer ouer-ruleth the *Stocke*.

It hath beene set downe by one of the *Ancients*, that if you take two *Twigs* of seuerall *Fruit Trees*, and flay them on the Sides, and then binde them close together, and set them in the ground, they will come vp in one *Stocke* ; But yet they will put forth their seuerall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnitie* of *Continuance*, is easier to procure, than *Vnitie* of *Species*. It is reported also, that *Vines* of *Red* and *White Grapes*, being set in the Ground, and the vpper Parts being flatted, and bound close together, will put forth *Grapes* of the seuerall Colours, vpon the same Branch ; And *Grape-Stones* of seuerall Colours within the same *Grape* : But the more, after a yeare or two ; The *Vnitie* (as it seemeth) growing more Perfect. And this will likewise helpe, if from the first *Vniting*, they be often Watred ; For all Moisture helpeth to *Vnion*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke* ; At the least for a time.

477

They report, that diuers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put vp *Plants Contiguous* ; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth.

478

It is reported, that young *Trees* of seuerall kindes, set contiguous, without any binding, and very often Watred, in a *Fruitfull Ground*, with the very Luxurie of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath beene propounded ; For that the *Binding* doth hinder the Naturall Swelling of the *Tree* ; which, while it is in Motion, doth better *vnite*.

479

There are many Ancient and Receiued Traditions and Observations, touching the *Sympathy* and *Antipathy* of *Plants* :

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For

Experiments
in Consort
touching the
Sympathy and
Antipathy of
Plants.

For that some will thrive best growing neere others ; which they impute to *Sympathy* : And some worse ; which they impute to *Antipathy*. But these are Idle and Ignorant Conceits ; And forsake the true *Indication* of the *Causes* ; As the most Part of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any such Secret *Friendship*, or *Hatred*, as they imagine ; And if we should be content to call it *Sympathy*, and *Antipathy*, it is vtterly mistaken ; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy* : For it is thus ; Wheresoeuer one *Plant* draweth such a particular Iuyce out of the Earth ; as it qualificth the Earth ; So as that Iuyce which remaineth is fit for the other *Plant* ; there the Neighbourhood doth good ; Because the Nourishments are contrary, or seuerall : But where two *Plants* draw (much) the same Iuyce, there the Neighbourhood hurteth ; For the one deceiueth the other.

480

First therefore, all *Plants* that doe draw much *Nourishment* from the Earth, and so soake the Earth, and exhaust it ; hurt all Things that grow by them ; As *Great Trees*, (especially *Ashes*,) and such *Trees*, as spread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently receiued) to the *Vine* only ; But it is an Enemy to any other *Plant* ; Because it draweth strongly the fattest Iuyce of the Earth. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne away ; This may be, because there it findeth worse Nourishment ; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nourisheth.

481

Where *Plants* are of seuerall Natures, and draw seuerall Iuyces out of the Earth, there (as hath beene said) the One set by the other helpe h : As it is set downe by diuers of the Ancients, that *Rew* doth prosper much, and becommeth stronger, if it be set by a *Figge-Tree* : which (we conceiue) is caused, Not by Reason of *Friendship*, but by *Extraction* of a Contrary Iuyce : The one Drawing Iuyce fit to result Sweet, the other bitter. So they haue set downe likewise, that a *Rose* set by *Garlicke* is sweeter : Which likewise may be, because the more Feride Iuyce of the Earth goeth into the *Garlicke* ; And the more Odorate into the *Rose*.

482

This wee see manifestly, that there be certaine *Corne-Flowers*, which come seldome or neuer in other places, vnlesse they be set ; But onely amongst *Corne* : As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitorie*. Neither can this be, by Reason of the Culture of the Ground, by Plowing, or Furrowing ; As some *Herbs*, and *Flowers*, will grow but in *Ditches* new Cast ; For if the *Ground* lie fallow, and vnfowbe, they will not come : So as it should seeme to be the *Corne*, that

that qualifieth the Earth, and prepareth it for their Growth.

This Obseruation, if it holdeth, (as it is very probable,) is of great vse, for the *Meliorating of Taste in Fruits, and Esculent Herbs*; And of the *Sent of Flowers*. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more strong, and bitter, (as the Ancients haue noted,) good store of *Rew* planted about the *Figge-Tree*, will make the *Figge* more sweet. Now the *Tastes* that doe most offend in *Fruits, and Herbs, and Roots* are *Bitter*; *Harrish*; *Sowre*; And *Watrish*, or *Flashy*. It were good therefore to make the *Trials* following.

Take *Wormewood*, or *Rew*, and set it neere *Lettuce*, or *Coleflory*, or *Artichoke*; And see whether the *Lettuce*, or the *Coleflory*, &c. become not the sweeter.

Take a *Seruite-Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which wee know haue *Fruits* of harsh and binding Iuyce, and set them neere a *Vine*, or *Figge-Tree*, and see whether the *Grapes*, or *Figs*, will not be the sweeter.

Take *Cucumbers*, or *Pumpions*, and set them (here and there) amongst *Muske-Melons*, and see whether the *Melons* will not be more *Winy*, and better tasted. Set *Cucumbers* (likewise) amongst *Radish*, and see whether the *Radish* will not be made the more *Biting*.

Take *Sorrell*, and set it amongst *Rasps*, and see whether the *Rasps* will not be the sweeter.

Take *Common Briar*, and set it amongst *Violets*, or *Wall-Flowers*, and see whether it will not make the *Violets*, or *Wall-Flowers* sweeter, and lesse *Earthy* in their Smell. So set *Lettuce*, or *Cucumbers*, amongst *Rosemary*, or *Bayes*, and see whether the *Rosemary*, or *Bayes*, will not be the more *Odorate*, or *Aromaticall*.

Contrariwise, you must take heed, how you set *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Rosemary* will leese in Sweetnesse, if it be set with *Lauender*, or *Bayes*, or the like. But yet, if you will correct the strength of an *Herbe*, you shall doe well to set other like *Herbs* by him, to take him downe; As if you should set *Tansy* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you should set *Rew* by *Common Wormewood*, it may be, the *Wormewood* would turne to be liker *Roman Wormewood*.

This *Axiome* is of large extent; And therefore would be scuered, and refined by *Triall*. Neither must you expect to haue a *Grosse Difference* by this kinde of Culture, but only *Further Perfection*.

Triall would be also made in *Herbs Poisonous*, and *Purgative*, whose ill Qualitie (perhaps) may be discharged, or attempted, by Setting stronger *Poisons*, or *Purgatiues*, by them.

It is reported, that the *Shrub* called *Our Ladies Senle*, (which is a Kinde of *Briony*), and *Coleworts*, set neere together, one or both will die. The Cause is, for that they be both great *Depredatours* of the Earth, and one of them starueth the other. The like is said of a *Reed*, and a *Brake*; Both which are succulent; And therefore the One de-

483

484

485

486

487

488

489

490

491

492

ceiveth the Other. And the like of *Hemlocke* and *Rew*; Both which draw strong Ioyces.

Some of the Ancients, and likewise diuers of the Moderne Writers, that haue laboured in *Naturall Magicke*, haue noted a *Sympathy*, between the *Sunne*, *Moon*, and some Principall *Starres*; And certaine *Herbs*, and *Plants*. And so they haue denominated some *Herbs Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest, that there are some *Flowers*, that haue *Respect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed most *Flowers*, doe open or spread their *Leaues* abroad, when the *Sunne* shineth serene and faire: And againe, (in some part,) close them, or gather them inward, either towards Night, or when the *Skie* is ouercast. Of this there needeth no such Solemne Reason to be assigned; As to say, that they reioyce at the presence of the *Sunne*; And mourne at the Absence thereof. For it is Nothing else, but a little Loading of the *Leaues*, and Swelling them at the Bottome, with the Moisture of the *Aire*; whereas the drie *Aire* doth extend them: And they make it a Peece of the wonder, that *Garden Clauer* will hide the *Stalke*, when the *Sunne* sheweth bright; Which is Nothing, but a full Expansion of the leaues. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mary-golds*; *Wart-wort*; *Mallow Flowers*; and others. The Cause is somewhat more Obscure than the former; But I take it to be no other, but that the Part against which the *Sunne* beateth, waxeth more faint and flaccide in the *Stalke*; And thereby lesse able to support the *Flower*.

What a little *Moisture* will doe in *Vegetables*, euen though they be dead, and seuered from the Earth, appeareth well in the *Experiment* of *Inglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the Bottome, and one smooth entire *Straw* at the Top. They take only the Part that is Wreathed, and cut off the other, leauing the *Beard* halfe the Breadth of a finger in length. Then they make a little *Crosse* of a *Quill*, long-ways of that Part of the *Quill*, which hath the *Pith*; And *Crosse*-ways of that peece of the *Quill* without *Pith*; The whole *Crosse* being the Breadth of a Finger high. Then they pricke the Bottome where the *Pith* is, and thereinto they put the *Oaten-beard*, leauing halfe of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceiue Men, as if somewhat in the Box did worke the *Feat*: In which, with a *Pinne*, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sinke downe, but to sticke. Then likewise by way of *Imposure*, they make a *Question*; As, Who is the Fairest Woman in the Company? Or, Who hath a Gloue, or Card? And cause Another to name diuers Persons: And vpon euery Naming, they sticke the *Crosse* in the Box, hauing first put it towards their Mouth, as if they charmed it; And the *Crosse* stirreth not; But when they come to the Person that they would take, As they hold the *Crosse* to their Mouth, they

they touch the *Beard* with the Tip of their Tongue, and wet it; And so sticke the *Crosse* in the Box; And then you shall see it turne finely and softly, three or foure Turnes; Which is caused by the vntwining of the *Beard* by the Moisture. You may see it more euidently, if you sticke the *Crosse* betweene your fingers, in Stead of the Box; And therefore you may see, that this Motion, which is effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

It is reported by some, that the *Herb* called *Rosa-Solis*, (wherof they make Strong Waters,) will at the Noone-day, when the *Sunne* shineth hot and bright, haue a great Dew vpon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the *Sunne*. Men fauour Wonders. It were good first to be sure, that the Dew that is found vpon it, be not the Dew of the Morning Preserued, when the Dew of other *Herbs* is breathed away; for it hath a smooth and thicke Lease, that doth not discharge the Dew so soone, as other *Herbs* that are more Spungy and Porous. And it may be Purslane, or some other *Herb*, doth the like, and is not marked. But if it be so, that it hath more Dew at Noone, than in the Morning, then sure it seemeth to be an Exudation of the *Herb* it selfe. As Plums sweat when they are set into the Ouen: for you will not (I hope) thinke, that it is like *Gedeons Fleece of Wool*, that the Dew should fall vpon that, and no where else.

It is certaine, that the *Honey-dews* are found more vpon *Oake-leaves*, than vpon *Ash*, or *Beech*, or the like: But whether any Cause be, from the Lease it selfe, to concoct the Dew; Or whether it be onely, that the Lease is Close and Smooth; (And therefore drinketh not in the Dew, but preserueth it;) may be doubted. It would be well inquired, whether *Manna* the Drug, doth fall but vpon certaine *Herbs* or *Leaves* onely. *Flowers* that haue deepe Sockets, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the Dew.

The Experience is, that the *Froth*, which they call *Woodscare*, (being like a kinde of Spittle,) is found but vpon certaine *Herbs*, and those Hot Ones; As *Lauender*, *Lauender-cotton*, *Sage*, *Hissope*, &c. Of the Cause of this enquire further; For it seemeth a Secret. There falleth also *Mildew* vpon *Corne*, and smutteth it; But it may be, that the same falleth also vpon other *Herbs*, and is not obserued.

It were good, Triall were made, whether the great Consent betweene *Plants* and *Water*, which is a principall Nourishment of them, will make an *Attraction* or Distance, and not at Touch onely. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course Canuasse: Fill it with Earth aboue the Canuasse, and let not the Earth be watred; Then sow some good *Seeds* in that Earth; But vnder the Canuasse, some halfe a foot in the Bottome of the *Vessell*, lay a great *Sponge*, thorowly wet in water; And let it lye so some ten Dayes; And see

Experiments
in Consort,
touching the
Making Herbs
and Fruits Me-
dicinable.

499

see whether the *Seeds* will sprout, and the *Earth* become more Moist, and the *Sponge* more dry. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is far stranger than this.

The *Altering* of the *Sent*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herb*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance; are but *Fancies*. The *Cause* is, for that those Things haue passed their Period, and nourish not. And all *Alteration* of Vegetables, in those Qualities, must be by somewhat, that is apt to goe into the Nourishment of the *Plant*. But this is true; that where *Kine* feed vpon *Wilde Garlick*, their *Milke* tasteth plainly of the *Garlick*: And the *Flesh* of *Muttons* is better tasted where the *Sheepe* feed vpon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrhus* of the *Liver*, by *Milke* of a *Cow*, that feedeth but vpon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rosemary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Mayden* that was fed with *Napellus*; (which is counted the Strongest Poyson of all *Vegetables*;) which with vse did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is obserued by some, that there is a vertuous *Bexoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth vpon the Mountaines, where there are *Theriackall Herbs*; And that without Vertue, from those that feed in the Valleyes, where no such *Herbs* are. Thus far I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; and likewise Bread tempred with diuers Powders; So of *Meat* also, (as *Flesh*, *Fish*, *Milke*, and *Egges*;) that they may be made of great vse for *Medicine*, and *Diet*, if the *Beasts*, *Fowle*, or *Fish*, be fed with a speciall kinde of food, fit for the Disease. It were a dangerous Thing also for secret Em-poysonments. But whether it may be applyed vnto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Iuyce; which is hardly capable of any speciall Quality, vntill the *Plant* doe assimilate it.

But lest our Incredulity may preiudice any profitable Operations in this kind, (especially since Many of the Ancients haue set them down,) We thinke good briefly to propound the foure *Meanes*, which they haue deuised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it vp againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified; And besides, it is a long time in Going vp, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*: Which is somewhat better: For if any Vertue be receiued from the *Medicine*, it hath the lesse way, and the lesse time, to goe vp. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, where-

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in the *Medicine* is *Infused*: Which I haue little Opinion of, because the *Seed*, (I doubt,) will not draw the Parts of the *Matter*, which haue the *Propriety*: But it will be farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watring* of the *Plant* oft, with an *Infusion* of the *Medicine*. This, in one respect, may haue more force than the rest; Because the *Medication* is oft renewed; Whereas the rest are applyed but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborne to receiue those fine *Impressions*; And besides, (as I said before,) they haue a great *Hill* to goe vp. I iudge therefore the likeliest way to be the *Perforation* of the *Body* of the *Tree*, in *seuerall Places*, one above the other; And the *Filling* of the *Holes* with *Dung mingled with the Medicine*.

And the *Watring* of those *Lumpes* of *Dung*, with
Squirts of an *Infusion* of the *Medicine* in
Dunged water, once in three
or foure Daies,

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NATVRALL HISTORIE.

VI. Century.



VR Experiments we take care to be, (as we haue often said,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vse*, or of *Discovery*: For we hate *Impostures*; And despise *Curiosities*. Yet because we must apply our Selues somewhat to Others, wee will set downe some *Curiosities* touching *Plants*.

Experiments
in Consort,
touching *Curiosities* about
Fruits and
Plants.

It is a *Curiosity*, to haue *seuerall Fruits* vpon *one Tree*; And the more, when some of them come *Earely*, and some come *Late*; So that you may haue, vpon the same *Tree*, *Ripe Fruits* all Sommer. This is easily done, by *Grafting* of *seuerall Cions*, vpon *seuerall Boughes*, of a *Stock*, in a good *Ground*, plentifully fed. So you may haue all *Kindes* of *Cherries*, and all *kindes* of *Plums*, and *Peaches*, and *Apricots*, vpon *one Tree*; But I conceiue the *Diuersity* of *Fruits* must be such, as will graft vpon the same *Stocke*. And therefore I doubt, whether you can haue *Apples*, or *Pearres*, or *Orenge*s, vpon the same *Stocke*, vpon which you graft *Plummes*.

501

It is a *Curiosity* to haue *Fruits* of *Diuers Shapes*, and *Figures*. This is easily performed by *Moulding* them, when the *Fruit* is young, with *Moulds* of *Earth*, or *Wood*. So you may haue *Cucumbers*, &c. as Long

502

as a Cane; Or as Round as a Spheare; Or formed like a Crosse. You may haue also Apples, in the forme of Peares, or Limons. You may haue also Fruit in more Accurate Figures; As we said of Men, Beasts, or Birds, according as you make the Moulds. Wherein you must vnderstand, that you make the Mould big enough, to containe the whole Fruit, when it is growne to the greatest: For else you will choake the Spreading of the Fruit; Which otherwise would spread it selfe, and fill the Concaue, and so be turned into the Shape desired; As it is in Mould-workes of Liquid Things. Some doubt may be conceived, that the Keeping of the Sunne from the Fruit, may hurt it: But there is ordinary experience of Fruit that groweth Couered. Quare also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the Fruit.

503 It is a Curiosity, to haue Inscriptions, or Engravings, in Fruit, or Trees. This is easily performed, by Writing with a Needle, or Bodkin, or Knife, or the like, when the Fruit, or Trees are young; For as they grow, so the Letters will grow more large, and Graphically.

Tenerisq; meos incidere Amores
Arboribus, crescent illa, crescetis Amores.

504 You may haue Trees apparelled with Flowers, or Herbs, by Boring Holes in the Bodies of them, and Putting into them Earth holpen with Mucke, and Setting Seeds, or Slips, of Violets, Strawberries, Wilde-Thyme, Camomill, and such like in the Earth. Wherein they doe but grow, in the Tree, as they doe in Pots; Though (perhaps) with some Feeding from the Trees. It would be tried also with Shoots of Vines, and Roots of Red-Roses; For it may be, they being of a more Ligneous Nature, will incorporate with the Tree it selfe.

505 It is an ordinary Curiosity, to Forme Trees and Shrubs, (as Rosemary, Iuniper, and the like,) into Sundry Shapes; which is done by Moulding them within, and Cutting them without. But they are but lame Things, being too small to keepe Figure: Great Castles made of Trees vpon Frames of Timber, with Turrets, and Arches, were anciently matters of Magnificence.

506 Amongst Curiosities, I shall place Colouration, though it be somewhat better: For Beauty in Flowers is their Preheminence. It is obserued by some, that Gilly-flowers, Sweet-Williams, Violets, that are Coloured, if they be neglected, and neither Watered, nor New Moulded, nor Transplanted, will turne White. And it is probable, that the White with much culture, may turne Coloured. For this is certaine, that the White Colour cometh of Scarcity of Nourishment; Except in Flowers that are onely White, and admit no other Colours.

507 It is good therefore, to see what Natures doe accompany what Colours; For by that you shall haue Light, how to induce Colours, by Producing those Natures. Whites are more Inodorate, (for the most part) than

than *Flowers* of the same kinde *Coloured*; As is found in *Single White Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. Wee finde also, that *Blossomes* of *Trees*, that are *White*, are commonly *Inodorate*; As *Cherries*, *Peares*, *Plummes*; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are *Blushy*, and *Smell sweet*. The Cause is, for that the Substance that maketh the *Flower*, is of the thinnest and finest of the *Plant*; Which also maketh *Flowers* to be of so dainty *Colours*. And if it bee too *Sparing*, and *Thinne*, it attaineth no *Strength* of *Odour*; Except it be in such *Plants*, as are very *Succulent*; Whereby they need rather to be *scanted* in their *Nourishment*, than *replenished*, to haue them *sweet*. As we see in *White Satyrion*, which is of a *Dainty Smell*; And in *Beane-Flowers*, &c. And againe, if the *Plant* be of *Nature*, to put forth *White Flowers* onely, and those not *thinne*, or *dry*, they are commonly of *rancke* and *fulsome Smell*; As *May-Flowers*, and *White Lillies*.

Contrariwise, in *Berries*, the *White* is commonly more *Delicate*, and *Sweet* in *Taste*, than the *Coloured*; As wee see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The Cause is, for that the *Coloured* are more *iuyced*, and *courser iuyced*; And therefore not so well and equally *Concocted*; But the *White* are better *proportioned*, to the *Disgestion* of the *Plant*.

But in *Fruits*, the *White* commonly is *meaner*; As in *Pear-Plums*, *Damasins*, &c. And the *Choicest Plummes* are *Blacke*; The *Malberry*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Haruest White-Plumme*, is a *base Plumme*; And the *Verdaccio* and *White Date-Plumme*, are no very good *Plummes*. The Cause is, for that they are all *Ouer-watry*: Whereas an higher *Concoction* is required for *Sweetnesse*, or *Pleasure* of *Taste*; And therefore all your dainty *Plummes*, are a little *dry*, and come from the *Stone*; As the *Muscle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to be *Blacke*, are of the *Nature* of *Berries*, *sweetest* such as are *Paler*; As the *Cœur-Cherry*, which inclineth more to *White*, is *sweeter* than the *Red*; But the *Egriot* is more *sowre*.

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Cloue-Gilly-Flower*, which is the most *Common*;) And sow it; And there will come vp *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with *Nourishment* in the *Earth*; So that the *Gardiners* finde, that they may haue two or three *Roots* amongst an hundred, that are *rare*, and of great *Price*: As *Purple*, *Carnation* of seuerall *Stripes*; The Cause is, (no doubt,) that in *Earth*, though it be *contiguous*, and in one *Bed*, there are very seuerall *Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which doe come vp *Purple*, doe alwayes come vp *Single*; The *Iyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Lease*. This Experiment of seuerall Colours,

lours, comming vp from one *Seed*, would be tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppy*, and *Hollyoke*.

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Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*; *Mulberries* likewise; and *Grapes*, though most toward the *Skinne*. There is a *Peach* also, that hath a *Circle of Red* towards the *Stone*: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they haue (many times) *Red* sides, are Coloured *Red* within. The Cause may be enquired.

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The Generall Colour of *Plants* is *Greene*; which is a Colour that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murvy*, or *Reddish*; And they be commonly *Young Leaves* that doe so; As it is in *Oakes*, and *Vines*, and *Husle*. *Leaves* rot into a *Yellow*; And some *Hollies* haue part of their *Leaves Yellow*, that are, (to all seeming,) as *Fresh* and *Shining*, as the *Greene*. I suppose also, that *Yellow* is a lesse *Succulent Colour*, than *Greene*; And a degree nearer *White*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand euer towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants Bloud-Red*, *Stalke* and *Leafe*, and all; as *Amaranthus*. Some *Herbs* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some haue *White Leaves*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure*, and a *Faire Purple*, are neuer found in *Leaves*. This sheweth, that *Flowers* are made of a *Refined Iuyce*, of the *Earth*; And so are *Fruits*: But *Leaves* of a more *Course*, and *Common*.

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It is a *Curiosity* also to make *Flowers Double*; Which is effected by *Often Remouing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not *Remouing*, proue *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips of Flowers*; And as soone as they come vp, to remoue them into *New Ground*, that is good. Enquire also, whether *Inoculating of Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Mauke-Roses*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*; But that *Tree* beareth no *Fruit*; And, it may be, that the same *Meanes*, which applied to the *Tree*, doth extremely accelerate the *Sap* to rise, and breake forth; Would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that haue *Blossomes Blush-Coloured*.

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The *Making of Fruits*, without *Core* or *Stone*, is likewise a *Curiosity*; And somewhat better: Because whatsoeuer maketh them so, is like to make them more *Tender* and *Delicate*. If a *Cions* or *Shoot*, fit to be set in the *Ground*, haue the *Pith* finely taken forth, (and not altogether, but some of it left, the better to saue the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to be, of diuiding a *Quick-Tree* downe to the *Ground*, and Taking out the *Pith*, and then binding it vp againe.

It is reported also, that a *Citron* grafted vpon a *Quince*, will haue small or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted vpon a *Stocke*, that beareth a *Sweeter Fruit*, may both make the *Fruit* sweeter, and more void of the harsh Matter of *Kernells*, or *Seeds*.

It is reported, that not only the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from *Rising* in the *Middest*, and *Turning* it to rise on the *Outside*, will make the *Fruit* without *Core*, or *Stone*; As if you should boare a *Tree* cleane thorow, and put a wedge in. It is true, there is some *Affinitie* betweene the *Pith*, and the *Kernell*, because they are both of a harsh *Substance*, and both placed in the *Middest*.

It is reported, that *Trees* watered perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core*, or *Stone*. And the Rule is generall, that whatsoeuer will make a *Wilde Tree* a *Garden Tree*, will make a *Garden Tree* to haue lesse *Core*, or *Stone*.

The Rule is certaine, that *Plants* for want of *Culture*, degenerate to be baser in the same *Kinde*; And sometimes so farre, as to change into another *Kinde*. 1. The *Standing long*, and not being *Remoued*, maketh them degenerate. 2. *Drought*, vnlesse the *Earth* of it selfe be moist, doth the like. 3. So doth *Remouing into worse Earth*, or *Forbearing to Compost the Earth*; As wee see that *Water-Mint* turneth into *Field-Mint*; And the *Colewort* into *Rape* by *Neglect*, &c.

Whatsoeuer *Fruit* vseth to bee set vpon a *Root*, or a *Slip*, if it bee sowne, will degenerate. *Grapes* sowne; *Figs*, *Almonds*, *Pomgranate Kernells* sowne; make the *Fruits* degenerate, and become *Wilde*. And againe, Most of those *Fruits* that vse to be grafted, if they be set of *Kernells*, or *Stones*, degenerate. It is true, that *Peaches*, (as hath beene touched before,) doe better vpon *Stones* Set, than vpon *Grafting*: And the Rule of Exception should seeme to be this; That whatsoeuer *Plant* requireth much *Moisture*, prospereth better vpon the *Stone*, or *Kernell*, than vpon the *Graft*. For the *Stocke*, though it giueth a finer *Nourishment*, yet it giueth a scantier, than the *Earth* at large.

Seeds, if they be very *Old*, and yet haue strength enough to bring forth a *Plant*, make the *Plant* degenerate. And therefore skilfull *Gardiners* make triall of the *Seeds*, before they buy them, whether they be good or no, by Putting them into *Water* gently *Boyled*; And if they be good, they will sprout within *Halfe an Houre*.

It is strange which is reported, that *Basill* too much exposed to the *Sunne*, doth turne into *Wilde Thyme*: Although those two *Herbs* seeme to haue small *Affinitie*; but *Basill* is almost the only *Hot Herbe*, that hath *Fat* and *Succulent Leaues*; Which *Oylineffe*, if it be drawne forth by the *Sunne*, it is like it will make a very great *Change*.

There is an old *Tradition*, that *Boughs of Oake*, put into the *Earth*, will put forth *Wilde Vines*: Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* *Putrifying*, qualifieth the *Earth*, to put forth a *Vine* of it selfe.

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Experiments
in Consort
touching the
Degenerating
of Plants; And
of the Transmu-
tation of them,
one into ano-
ther.

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It is not impossible, and I have heard it verified, that vpon Cutting downe of an Old Timber-Tree, the *Stub* hath put out sometimes a Tree of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it be true, the Cause may be, for that the old *Stub* is too scant of Iuyce, to put forth the former Tree; And therefore putteth forth a Tree of a smaller kinde, that needeth lesse Nourishment.

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There is an Opinion in the Countrey, that if the same Ground be oft sown, with the Graine that grew vpon it, it will, in the end, grow to be of a baser kinde.

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It is certaine, that in very Sterile Yeares, Corne sowne will grow to an Other Kinde.

Grandia saepe quibus mandamus Hordea Sulcis,

Infelix Lolium, & steriles dominantur Avena.

And generally it is a Rule, that Plants, that are brought forth by Culture, as Corne, will sooner change into other Species, than those that come of themselves: For that Culture giueth but an Aduentitious Nature, which is more easily put off.

This worke of the Transmutation of Plants, one into another, is *inter Magnalia Naturae*: For the Transmutation of Species is, in the vulgar philosophie, pronounced Impossible: And certainly, it is a thing of difficultie, and requireth deepe Search into Nature: But seeing there appeare some manifest Instances of it, the Opinion of Impossible is to be reiected; And the Meanes thereof to be found out. Wee see, that in Liuing Creatures, that come of Putrefaction, there is much Transmutation, of one into another; As Catterpillers turne into Flies, &c. And it should seeme probable, that whatsoeuer Creature, hauing life, is generated without Seed, that Creature will change out of one Species into another. For it is the Seed, and the Nature of it, which locketh and boundeth in the Creature, that it doth not expatiate. So as wee may well conclude, that seeing the Earth, of it selfe, doth put forth Plants, without Seed, therefore Plants may well haue a Transmigration of Species. Wherefore Wanting Instances, which doe occurre, wee shall giue Directions of the most likely Trialls: And generally, wee would not haue those, that read this our Worke of *Sylua Sylvarum*, account it strange, or thinke that it is an Ouer-Haste, that wee haue set downe Particulars vntried; For contrariwise, in our owne Estimation, we account such Particulars, more worthy, than those that are already

ready tried and knowne. For these Later must be taken as you finde them; But the Other doe leuell Point blanke at the *Inuenting of Causes, and Axiomes.*

First therefore you must make account, that if you will haue one *Plant* change into another, you must haue the *Nourishment* ouer-rule the *Seed*; And therefore you are to practise it by *Nourishments* as contrary, as may be, to the *Nature* of the *Herbe*; So neuerthelesse as the *Herbe* may grow; And likewise with *Seeds* that are of the Weakest Sort, and haue least Vigour. You shall doe well therefore, to take *Marsh-Herbs*, and Plant them vpon Tops of Hills, and Champaignes; And such *Plants* as require much Moisture, vpon Sandy and very drie Grounds. As for Example, *Marsh-Mallows*, and *Sedge*, vpon Hills; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, vpon a *Sandy Plot*: So contrariwise plant *Bushes*, *Heath*, *Ling*, and *Brakes*, vpon a *Wet* or *Marsh Ground*. This I conceiue also, that all *Esculent* and *Garden-Herbs*, set vpon the Tops of Hills, will proue more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wilde-Herbs* you may make *Sallet-Herbs*. This is the first Rule for *Transmutation of Plants*.

The second Rule shall be to burie some few *Seeds*, of the *Herbe* you would change, amongst other *Seeds*; And then you shall see, whether the Iuyce of those other *Seeds*, doe not so qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-Seed* amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parsly-Seed*; Or *Basil-Seed* amongst *Thyme-Seed*; And see the Change of Taste, or otherwise. But you shall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forraine *Seed*.

The third Rule shall be, the *Making* of some *Medley* or *Mixture* of *Earth*, with some other *Plants* *Bruised*, or *Shauen*, either in *Leafe* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort-Leaves*, stamped, and set in it *Artichokes*, or *Parsnips*; So take *Earth* made with *Maioram*, or *Origanum*, or *Wilde-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the Proesse of Nature still will be, (as I conceiue,) not that the *Herbe* you worke vpon, should draw the Iuyce of the Forraine *Herbe*; (For that Opinion wee haue formerly reiected;) But that there will be a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herbe*.

The fourth Rule shall be, to marke what *Herbs*, some *Earths* doe put forth of themselves; And to take that *Earth*, and to Pot it, or to Vessell it; And in that to set the *Seed* you would change: As for example, take from vnder Walls, or the like, where *Nettles* put forth in abundance, the *Earth* which you shall there finde, without any *String*, or *Root* of the *Nettles*; And Pot that *Earth*, and set in it *Stock-gilly-flowers*, or *Wall-Flowers*, &c. Or sow in the *Seeds* of them; And see what the Event will be: Or take *Earth*, that you haue prepared to put forth *Mush-*
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comes, of it selfe, (whereof you shall finde some *Instances* following;) And sow in it *Purslane-Seed*, or *Lettuce-Seed*; For in these *Experiments*, it is likely enough, that the *Earth* being accustomed to send forth one Kinde of Nourishment, will alter the new *Seed*.

530 The fifth Rule shall be, to make the *Herbe* grow *Contrary to his Nature*; As to make *Ground-Herbes* rise in *Height*: As for example; Carry *Camomill*, or *Wilde-Thyme*, or the *Greene Strawberry*, vpon Sticks, as you doe *Hops* vpon Poles; And see what the Euent will be.

531 The sixth Rule shall be, to make *Plants* grow out of the *Sunne*, or *Open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell vp *Earth*, and sow some *Seed* in it, and put it in the Bottome of a Pond; Or put it in some great hollow *Tree*; Trie also the Sowing of *Seeds*, in the Bottomes of *Cauces*; And Pots with *Seeds* sowne, hanged vp in Wells, some distance from the Water, and see what the Euent will be.

Experiments
in Consort
touching the
Proceritie, and
Lownesse, and
*Artificiall dwarf-
ing* of Trees.

It is certaine, that *Timber-Trees* in *Coppice-Woods*, grow more vpright, and more free from *Vnder-Boughs*, than those that stand in the *Field*: The *Cause* whereof is, for that *Plants* haue a *Naturall Motion*, to get to the *Sunne*; And besides, they are not glutted with too much Nourishment; For that the *Coppice* shareth with them; And Repletion euer hindreth *Stature*; Lastly, they are kept warme; And that euer in *Plants* helpeth *Mounting*.

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533 *Trees*, that are, of themselves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gums*;) as *Firrs*, and *Pines*, mount of themselves in *Height* without *Side-Boughs*, till they come towards the Top. The *Cause* is, partly *Heat*; And partly *Tenuitie* of *Iuyce*; Both which send the Sap vpwards. As for *Iuniper*, it is but a *Shrub*, and groweth not bigge enough in Body, to maintaine a tall *Tree*.

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It is reported, that a Good Strong *Canuas*, spread over a *Tree* grafted low, soone after it putteth forth, will *dwarfe* it, and make it spread. The *Cause* is plaine; For that all Things that grow, will grow as they finde *Roome*.

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Trees are generally set of *Roots*, or *Kernells*; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*;) some of the *Slips* will take; And those that take, (as is reported,) will be *Dwarfe-Trees*. The *Cause* is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*.

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All *Plants*, that put forth their Sap hastily, haue their Bodies not proportionable to their Length; And therefore they are *Winders*, and *Cree-pers*; As *Iuy*, *Briomy*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a slow Putting forth, and lesse Vigour of *Mounting*.

Experiments
in Consort,
touching the

The *Scripture* saith, that *Salomon* wrote a *Naturall History*, from the *Cedar of Libanus*, to the *Mosse* growing vpon the *Wall*:

For

For so the best *Translations* haue it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

Mosse groweth chiefly vpon *Ridges* of *Houses*, tiled or thatched, And vpon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant *Greene*. The Growing vpon *Slopes* is caused, for that *Mosse*, as on the one side it commeth of *Moisture* and *Water*, so on the other side the *Water* must but *Slide*, and not *Stand* or *Poole*. And the Growing vpon *Tiles*, or *Walls*, &c. is caused, for that those dried *Earths*, hauing not *Moisture* sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by *Age*, or otherwise, they grow to relent and resolute, they sometimes put forth *Plants*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little *Stalkes*, besides the low *Thrumme*.

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Mosse groweth vpon *Alleyes*, especially such as lye *Cold*, and vpon the *North*; As in diuers *Tarrasses*: And againe, if they be much trodden; Or if they were, at the first, grauelled; For wheresoeuer *Plants* are kept downe, the *Earth* putteth forth *Mosse*.

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Old Ground, that hath beene long vnbroken vp, gathereth *Mosse*: And therefore Husbandmen vse to cure theit *Pasture Grounds*, when they grow to *Mosse*, by *Tilling* them for a yeare, or two: Which also dependeth vpon the same *Cause*; For that, the more *Sparing* and *Staruing* Iuyce of the *Earth*, insufficient for *Plants*, doth breed *Mosse*.

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Old Trees are more *Mossy*, (farre) than *Young*; For that the *Sap* is not so francke as to rise all to the *Boughes*, but tireth by the way, and putteth out *Mosse*.

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Fountaines haue *Mosse* growing vpon the *Ground* about them;

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Muscoli Fontes;

The *Cause* is, for that the *Fountaines* draine the *Water* from the *Ground* *Adiacent*, and leaue but sufficient *Moisture* to breed *Mosse*: And besides, the *Coldnesse* of the *Water* conduceth to the same.

The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is *Excerned*, and doth not *Assimilate*. And vpon great *Trees* the *Mosse* gathereth a *Figure*, like a *Leafe*.

542

The *Moister Sort* of *Trees* yeeld little *Mosse*; As we see in *Aspes*, *Poplars*, *Willowes*, *Beeches*, &c. Which is partly caused, for the Reason that hath beene giuen, of the francke Putting vp of the *Sap* into the *Boughes*; And partly, for that the *Barkes* of those *Trees*, are more *Close* and *Smooth*, than those of *Oakes*, and *Asbes*; Whereby the *Mosse* can the hardlier issue out.

543

In *Clay-Grounds*, all *Fruit-Trees* grow full of *Mosse*, both vpon *Body* and *Boughes*; Which is caused, partly by the *Coldnesse* of the *Ground*, whereby the *Plants* nourish lesse; And partly by the *Toughnesse* of the *Earth*, whereby the *Sap* is shut in, and cannot get vp, to spread so franckly, as it should doe.

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Wee haue said heretofore, that if *Trees* be *Hide-bound*, they wax lesse Fruitfull, and gather *Mosse*: And that they are holpen by *Hacking*, &c. And therefore by the Reason of Contraries, if *Trees* be bound in with *Cords*, or some Outward *Bands*, they will put forth more *Mosse*: Which (I thinke) happeneth to *Trees* that stand Bleake, and vpon the Cold Winds. It would also be tried, whether, if you couer a *Tree*, somewhat thicke vpon the top, after his Powling, it will not gather more *Mosse*. I thinke also, the *Watring* of *Trees* with Cold *Fountaine-Water*, will make them grow full of *Mosse*.

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There is a *Mosse* the *Perfumers* haue, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quare* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* sake, being a Thing of Price, I haue set downe the last *Experiments*, how to multiply, and call on *Mosses*.

Next vnto *Mosse*, I will speake of *Musbromes*; Which are likewise an *Vnperfect Plant*. These *Musbromes* haue two strange *Properties*; The One, that they yeeld so *Delicious* a *Meat*; The other, that they come vp so *bastily*; As in a *Night*; And yet they are *Vnsowne*. And therefore, such as are Vpstarts in State, they call, in reproch, *Musbromes*. It must needs bee therefore, that they be made of much *Moisture*; And that *Moisture* Fat, *Grosse*, and yet somewhat *Concocted*. And (indeed) we finde, that *Musbromes* cause the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Empoyson. And this sheweth, that they are Windy; And that Windinesse is *Grosse*, and Swelling; Not Sharpe, or Griping. And vpon the same reason *Musbromes* are a venereous *Meat*.

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It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the *Moistest* of *Trees*,) cut small, and cast into *Furrowes* well dunged, will cause the Ground to put forth *Musbromes*, at all *Seasons* of the *Yeare*, fit to be eaten. Some adde to the Mixture *Leauen* of *Bread*, resolued in *Water*.

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It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, bee set on *Fire*, in a *Showry Season*, it will put forth great Store of *Musbromes*.

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It is reported, that *Harts-Horne*, *Shauen*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth vp *Musbromes*. And we know *Harts-Horne* is of a Fat and Clammy Substance: And it may be *Oxe-Horne* would doe the like.

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It hath beene reported, though it be scarce credible, that *Iuy* hath growne out of a *Stags-Horne*; Which they suppose, did rather come from

from a *Confrication* of the *Horne* vpon the *Iuy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may be *Trial* made of some *Seeds*, as that of *Fennel-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

There is also another *Yperperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones *Hat*; Which they call a *Toads-Stoole*: But it is not *Esculent*; And it groweth (commonly) by a dead *Stub* of a *Tree*; And likewise about the *Roots* of *Rotten Trees*: And therefore seemeth to take his *Iuyce* from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moisture*.

There is a *Cake*, that groweth vpon the *Side* of a *Dead Tree*, that hath gotten no *Name*, but it is large, and of a *Chestnut Colour*, and hard, and pithy; Whereby it should seeme, that euen *Dead Trees* forget not their *Putting forth*; No more than the *Carcasses* of *Mens Bodies*, that put forth *Haire*, and *Nailles*, for a *Time*.

There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* vpon the *Breaking*: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to bee good for *Kibes*. Belike it hath a *Corrosiue*, and *Fretting Nature*.

There is an *Heb* called *Jewes-Eare*, that groweth vpon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange *Property*; For in *Warme water*, it swel- leth, and openeth extremely. It is not greene, but of a dusky browne *Colour*. And it is vsed for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to haue a *Mollifying*, and *Lenifying Vertue*.

There is a *Kinde* of *Spongy Excrecence*, which groweth chiefly vpon the *Roots* of the *Laser-Tree*; And sometimes vpon *Cedar*, and other *Trees*. It is very *White*, and *Light*, and *Friable*: Which we call *Agarick*. It is famous in *Physicke* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liuor*: But *Offensiue* to the *Stomack*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*.

We finde no *Super-Plant*, that is a *Formed Plant*, but *Misseltoe*. They haue an idle *Tradition*, that there is a *Bird*, called a *Missel-Bird*, that feedeth vpon a *Seed*, which many times shee cannot digest, and so expel- leth it whole with her *Excrement*: which falling vpon a *Bough* of a *Tree*, that hath some *Rift*, putteth forth the *Misseltoe*. But this is a *Fable*: For it is not probable, that *Birds* should feed vpon that they cannot digest. But allow that, yet it cannot be for other *Reasons*: For First, it is found but vpon certaine *Trees*; And those *Trees* beare no such *Fruit*, as may al- lure that *Bird* to sit, and feed vpon them. It may be, that *Bird* feedeth vpon the *Misseltoe-Berries*, and so is often found there; Which may haue giuen occasion to the *Tale*. But that which maketh an *End* of the *Que-*

tion, is, that *Misseltoe* hath beene found to put forth vnder the *Boughes*, and not (onely) about the *Boughes*: So it cannot be any Thing that falleth vpon the *Bough*. *Misseltoe* groweth chiefly vpon *Crab-Trees*, *Apple-Trees*, sometimes vpon *Hassles*; And rarely vpon *Oakes*; The *Misseltoe* whereof is counted very *Medicinall*. It is euer greene, Winter and Summer; And beareth a *White Glistering Berry*: And it is a *Plant*, vtterly differing from the *Plant*, vpon which it groweth. Two things therefore may be certainly set downe: First, that *Super-fetation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth excrete, and cannot assimilate; For else it would goe into a *Bough*; And besides, it seemeth to be more *Fat* and *Vnctuous*, than the *Ordinary Sap* of the *Tree*; Both by the *Berry*, which is *Clammy*; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557 This *Experiment* of *Misseltoe* may giue *Light* to other *Practises*. Therefore *Triall* would be made, by *Ripping* of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Watring* of the *Wound* every *Day*, with *Warne Water Dugged*, to see if it would bring forth *Misseltoe*, or any such like Thing. But it were yet more likely to try it, with some other *Watring*, or *Anointing*, that were not so *Naturall* to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be such Things as kill not the *Bough*.

558 It were good to try, what *Plants* would put forth, if they be forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and couer it, some thicknesse, with *Clay* on the *Top*; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cion*, being turned downe into *Clay*: Therefore, in this *Experiment* also, the *Tree* would be closed with somewhat, that is not so *Naturall* to the *Plant*, as *Clay* is. Try it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559 A *Man* may count the *Prickles* of *Trees* to be a kinde of *Excrecence*; For they will neuer be *Boughes*, nor beare *Leaves*. The *Plants* that haue *Prickles*, are *Thornes*, blacke and white; *Brier*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose-Berry*; *Berberis*; These haue it in the *Bough*. The *Plants* that haue *Prickles* in the *Leafe*, are; *Holly*; *Iuniper*; *Whin-bush*; *Thistle*; *Nettles* also haue a small *Venemous Prickle*; So hath *Borrage*, but harmelesse. The *Cause* must be *Hasty Putting forth*; *Want* of *Moisture*; And the *Closenesse* of the *Barke*; For the *Haste* of the *Spirit* to put forth, and the *Want* of *Nourishment* to put forth a *Bough*, and the *Closenesse* of the *Barke*, cause *Prickles* in *Boughes*; And therefore they are euer like a *Pyramis*, for that the *Moisture* spendeth after a little *Putting forth*. And for *Prickles* in *Leaves*, they come also of *Putting forth more Iuyce* into the *Leafe*, than can spread in the *Leafe* smooth; And therefore the *Leaves* otherwise are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but neuer *Plaine*, but as it were with *Folds*, for the same *Cause*.
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There be also *Plants*, that though they haue no *Prickles*, yet they haue a Kinde of *Downy* or *Veluet Rine*, vpon their *Leaues*; As *Rose-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe* or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, haue beene applied, (with successe,) to the *Wrests* of those that haue had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a *Sanatiue* vertue, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgery*.

Another Kinde of *Excrecence* is an *Exudation* of *Plants*, ioyned with *Putrefaction*; As we see in *Oake-Apples*, which are found chiefly vpon the *Leaues* of *Oakes*; And the like vpon *Willowes*: And Countrey People haue a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a *Signe* of a *Pestilent Yeare*; Which is a likely Thing, because they grow of *Corruption*.

There is also vpon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of diuers *Colours*; Which if you cut, you shall euer finde full of little white *Wormes*.

It is certaine, that *Earth* taken out of the *Foundations* of *Vanits* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth *Sundry* Kindes of *Herbs*: But some *Time* is required, for the *Germination*; For if it be taken, but from a *Fathome* deepe, it will put forth the *First Yeare*; If much deeper, not till after a *Yeare*, or *Two*.

Experiments
in Consort,
touching the
Producing of
Perfect Plants
without Seed.

The *Nature* of the *Plants* growing out of *Earth* so taken vp, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* be *Soft*, and *Fine*, it putteth forth *Soft Herbs*; As *Grasse*, *Plantine*, and the like; If the *Earth* be *Harder* and *Courser*, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c.

It is *Common Experience*, that where *Alleyes* are close *Grauelled*, the *Earth* putteth forth, the first yeare, *Knot-grasse*, and after *Spire-grasse*. The *Cause* is, for that the *Hard Grauell*, or *Pebble* at the first *Laying*, will not suffer the *Grasse* to come forth vpright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the *Top*, the *Ordinary Grasse* commeth vp.

It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, some depth, and Potted, will put forth *Herbs* of a *Fat* and *Iuicy Substance*; As *Penny-wort*, *Purslane*, *Housleeke*, *Penny-royall*, &c.

The *Water* also doth send forth *Plants*, that haue no *Roots* fixed in the *Bottom*; But they are lesse *Perfect Plants*, being almost but *Leaues*, and those *Small ones*: Such is that we call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher *Greene*, and putteth forth a little *String* into the *Water*, farre from the *Bottom*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so haue a *Number* of other *Herbs* that grow in *Ponds*.

It is reported by some of the *Ancients*, and some *Moderne Testimony* likewise, that there be some *Plants*, that grow vpon the *Top* of the *Sea*; Being

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Being supposed to grow of some Concretion of Slime from the Water, where the Sunne beateth hot, and where the Sea stirreth little. As for *Alga Marina*, (*Sea-weed*;) and *Eryngium* (*Sea-Thistle*;) both haue *Roots*; but the *Sea-weed* vnder the Water, the *Sea-Thistle* but vpon the Shore.

569 The Ancients haue noted, that there are some *Herbs*, that grow out of *Snow*, laid vp close together, and *Putrified*; And that they are all *Bitter*; And they name one specially, *Flomus*, which wee call *Moth-Mullein*. It is certaine, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not vnlike, that it may likewise put forth *Plants*.

570 The Ancients haue affirmed, that there are some *Herbs*, that grow out of *Stone*; Which may be, for that it is certain, that *Toads* haue been found in the Middle of a *Free-Stone*. We see also, that *Flints*, lying about *Ground*, gather *Mosse*; And *Wall-Flowers*, and some other *Flowers*, grow vpon *Walls*; But whether vpon the *Maine Bricke*, or *Stone*, or whether out of the *Lime*, or *Chinckes*, is not well obserued; For *Elders* and *Ashes* haue beene scene to grow out of *Steeple*s: But they manifestly grow out of *Clefts*; In so much as when they grow big, they will disioyne the *Stone*. And besides it is doubtfull, whether the *Mortar* it selfe putteth it forth, or whether some *Seeds* be not let fall by *Birds*. There be likewise *Rock-Herbs*; But I suppose those are, where there is some *Mould*, or *Earth*. It hath likewise beene found, that great *Trees* growing vpon *Quarries*, haue put downe their *Root* into the *Stone*.

571 In some *Mines* in *Germany*, as is reported, there grow in the *Bottom* *Vegetables*; And the *Worke-Folkes* vse to say, they haue *Magicall Vertue*; And will not suffer Men to gather them.

572 The *Sea-Sands* seldome beare *Plants*. Whereof the Cause is yeelded, by some of the *Ancients*, for that the *Sunne* exhaleth the *Moisture*, before it can incorporate with the *Earth*, and yeeld a *Nourishment* for the *Plant*. And it is affirmed also, that *Sand* hath (alwayes) his *Root* in *Clay*; And that there be no *Veines* of *Sand*, any great depth within the *Earth*.

573 It is certaine, that some *Plants* put forth for a time, of their owne *Store*, without any *Nourishment* from *Earth*, *Water*, *Stone*, &c. Of which Vide the Experiment 29.

Experiments
in Consort
touching For-
raine Plants.

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It is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballast* of *Ships*, cast vpon some *Grounds* in *Italy*, did put forth *Forraine Herbs*, to vs in *Europe* not knowne; And, that which is more, that of their *Roots*, *Barkes*, and *Seeds*, contused together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs*, much like the Other.

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Plants brought out of *Hot Countries*, will endeuour to put forth, at the same *Time*, that they vsually do in their owne *Climate*; And therefore to preserue them, there is no more required, than to keepe them from the Iniury of Putting backe by *Cold*. It is reported also, that *Graine* out of

of the *Hotter Countries* translated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Countrey*. It is likely, that this will proue better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; And so the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embased by the *Ground*, to which it is Remoued.

Many *Plants*, which grow in the *Hotter Countries*; being set in the *Colder*, will neuerthelesse, euen in those *Cold Countries*, being sowne of *Seeds* late in the *Spring*, come vp and abide most Part of the *Summer*; As we finde it in *Orenge*, and *Limon-Seeds*, &c. The *Seeds* whereof, Sowne in the End of *Aprill*, will bring forth Excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Cloue-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be sowne, would doe the like.

There be some *Flowers*, *Blossomes*, *Graines*, and *Fruits*, which come more *Early*; And Others which come more *Late* in the *Yeare*. The *Flowers* that come early, with vs, are; *Prime-Roses*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and some early *Tulippa's*. And they are all *Cold Plants*; Which therefore, (as it should seeme,) haue a quicker *Perception*, of the *Heat* of the *Sunne* Increasing, than the *Hot Herbs* haue; As a *Cold Hand* will sooner finde a little *Warmth*, than a *Hot*. And those that come next after, are *Wall-Flowers*, *Cowslips*, *Hyacinths*, *Rose-mary-Flowers*, &c. And after them, *Pinks*, *Roses*, *Flowerdeluces*, &c. And the latest are *Gilly-Flowers*, *Holly-oakes*, *Larkes-Foot*, &c. The Earliest *Blossomes* are, the *Blossomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of such *Trees*, as haue much *Moisture*, either *Watric*, or *Oylie*. And therefore *Crocus Vernus* also, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For those also finde the *Sunne* sooner than the *Drier Trees*. The *Graines* are, first *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Pease* and *Beanes*. For though *Greene Pease* and *Beanes* be eaten sooner, yet the *Drie Ones*, that are vsed for *Horse-Meat*, are ripe last; And it seemeth that the *Fatter Graine* commeth first. The Earliest *Fruits* are, *Strawberries*, *Cherries*, *Gooseberries*, *Carrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Rasps*; And after them *Damasins*, and most Kinde of *Plums*, *Peaches*, &c. And the latest are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Heps*, *Medlars*, *Seruices*, *Cornelians*, &c.

It is to be noted, that (commonly) *Trees* that ripen latest, blossom soonest: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it seemeth to be a *Worke* of *Providence*, that they blossom so soone; For otherwise, they could not haue the *Sunne* long enough to ripen.

There be *Fruits*, (but rarely,) that come twice a *Yeare*; as some *Peares*, *Strawberries*, &c. And it seemeth they are such, as abound with *Nourishment*; Whereby after one *Period*, before the *Sunne* waxeth too weake, they can endure another. The *Violet* also, amongst *Flowers*, commeth twice a *Yeare*; Especially the *Double White*; And that also

Experiments
in Consort,
touching the
Seasons in
which *Plants*
come forth.

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is a *Plant* full of Moisture. *Roses* come twice, but it is not without *Cutting*, as hath beene formerly said.

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In *Muscovia*, though the *Corne* come not vp, till late *Spring*, yet their *Harvest* is as Early as Ours. The Cause is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee see with vs, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after those kinde of *Winters* likewise, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the same time; Which troubleth the *Husbandman* many times; For you shall haue *Red Roses*, and *Damask Roses*, come together; And likewise the *Harvest* of *Wheat* and *Barley*. But this happeneth euer, for that the Earlier staith for the Later; And not that the Later commeth sooner.

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There be diuers *Fruit-Trees*, in the *Hot Countries*, which haue *Blossomes*, and *Young Fruit*, and *Ripe Fruit*, almost all the *Yeare*, succeeding one another. And it is said, the *Orange* hath the like with vs, for a great Part of *Summer*; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to haue so; But that either they want *Iuyce* to spend; Or they meet with the *Cold* of the *Winter*: And therefore this *Circle of Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

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Some *Herbs* are but *Annually*, and die, *Root* and all, once a *Yeare*; As *Borage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basill*, *Tobacco*, *Mustard-Seed*, and all kinde of *Corne*; Some continue many *Yeares*; As *Hyssope*, *Germander*, *Lauander*, *Fennell*, &c. The Cause of the *Dying* is double; The first is the *Tendernesse* and *Weaknesse* of the *Seed*, which maketh the *Period* in a small time; As it is in *Borage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are *Hot*. The other Cause is, for that some *Herbs* can worse endure *Cold*; As *Basill*, *Tobacco*, *Mustard-Seed*. And these haue (all) much *Heat*.

Experiments
in Confort
touching the
Lasting of Herbs
and Trees.

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The *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oakes*, *Elme*, *Chest-Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largest Size*, are of small *Durance*; Whereas *Hyssope*, *Winter-Samory*, *Germander*, *Thyme*, *Sage*, will last long. The Cause is, for that *Trees* last according to the *Strength*, and *Quantitie* of their *Sap* and *Iuyce*; Being well munit by their *Barke* against the *Injuries* of the *Aire*: But *Herbs* draw a *Weake Iuyce*; And haue a *Soft Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Sticky Stalke*.

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Trees that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chestnuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Pears*, *Plums*, &c. The Cause is the *Fatnesse* and *Oyline* of the *Sap*; Which euer wasteth lesse, than the more *Watry*.

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Trees, that bring forth their *Leaves* late in the *Yeare*, and cast them likewise late, are more *lasting*, than those that sprout their *Leaves* Early, or shed

shed them betimes. The Cause is, for that the late *Comming forth* sheweth a *Moisture* more fixed; And the other more loose, and more easily resolved. And the same Cause is, that *Wilde-Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is *Acide*, more than those whose *Fruit* is sweet.

Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For euery *Cutting* causeth a Renouation of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Insomuch as *Annvall Plants*, if you cut them seasonably, and will spare the vse of them, and suffer them to come vp still young, will last more Yeares than one; As hath beene partly touched; Such as is *Lettuce*, *Parplane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Ouer-growne-Trees*, in Church-yards, or neare Ancient Buildings, and the like, are *Pollards*, or *Dostards*, and not *Trees* at their full Height.

Some Experiment would be made, how by *Art* to make *Plants* more *Lasting*, than their ordinary Period; As to make a *Stalke* of *Wheat*, &c. last a whole yeare. You must euer presuppose, that you handle it so, as the *Winter* killeth it not; For we speake onely of *Prolonging* the *Naturall Period*. I conceiue, that the *Rule* will hold; That whatsoever maketh the *Herbe* come later, than at his time, will make it last longer time: It were good to try it, in a *Stalke* of *Wheat*, &c. set in the Shade, and compassed with a *Case* of *Wood*, not touching the *Straw*, to keepe out *Open Aire*.

As for the *Preseruatiō* of *Fruits*, and *Plants*, as well vpon the *Tree*, or *Stalke*, as gathered, we shall handle it vnder the Title of *Conseruation* of *Bodies*.

The *Particular Figures* of *Plants* we leaue to their *Descriptions*; But some few Things, in generall, we will obserue. *Trees* and *Herbs*, in the *Growing forth* of their *Boughes*, and *Branches*, are not *Figured*, and keep no Order. The Cause is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the *Bodies* of *Trees*, and *Stalkes* of *Herbs*,) till they begin to branch; And then, when they make an *Eruption*, they breake forth casually, where they finde best way, in the *Barke*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Peare-Tree*, (which the *Critickes* will haue to borrow his name of *πύρ*, *Fire*,) *Orenge-Trees*, *Firre-Trees*, *Sernice-Trees*, *Lime-Trees*, &c. And some are more spred and broad; As *Beeches*, *Hornebeame*, &c. The rest are more indifferent. The Cause of *Scattering* the *Boughes*, is the *Hasty* breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height, but branch neare the *Ground*. The Cause of the *Pyramis*, is the *Keeping in* of the *Sap*, long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The

586

587

Experiments
in Consort
touching the
seuerall Figures
of Plants.

588

Spreading is caused by the *Carrying* vp of the *Sap*, plentifully, without Expende; And then putting it forth speedily, and at once.

589

There be diuers *Herbs*, but no *Trees*, that may be said to haue some kinde of Order, in the Putting forth of their *Leaves*. For they haue *Ioyns*, or *Knuckles*, as it were Stops in their *Germination*; As haue *Gilly-Flowers*, *Pinckes*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The Cause whereof is, for that the *Sap* ascendeth vnequally, and doth (as it were) tire and stop by the way. And it seemeth, they haue some *Clofenesse*, and *Hardnesse* in their *Stalke*, which hindreth the *Sap* from going vp, vntill it hath gathered into a Knot, and so is more vrged to put forth. And therefore, they are most of them hollow, when the *Stalke* is dry. As *Fennell-Stalke*, *Stubble*, and *Canes*.

590

Flowers haue (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Four*; As in *Prime-Roses*, *Brier-Roses*, *Single Muske-Roses*, *Single Pinkes*, and *Gilly-Flowers*, &c. which haue five *Leaves*; *Lillies*, *Flower-de-luces*, *Borage*, *Buglosse*, &c. which haue four *Leaves*. But some put forth *Leaves* not Numbred; But they are euer small Ones; As *Mary-Golds*, *Trifoile*, &c. We see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the *Fiue Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*, &c. *Leaves* also are all *Figured*; Some Round, Some Long; None Square; And many iagged on the Sides; Which *Leaves* of *Flowers* seldome are. For I account the *Iagging* of *Pinkes*, and *Gilly-Flowers*, to be like the *Inequality* of *Oake-leaves*, or *Vine-leaves*, or the like; But they seldome or neuer haue any small *Parles*.

Experiments
in Consort,
touching some
Principall Differences
in Plants.

591

Of *Plants*, some few put forth their *Blossomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But most put forth some *Leaves* before their *Blossomes*; As *Apples*, *Pears*, *Plums*, *Cherries*, *White-Thorne*, &c. The Cause is, for that those, that put forth their *Blossomes* first, haue either an *Acute* and *Sharpe Spirit*; (And therefore commonly they all put forth early in the Spring, and ripen very late; As most of the *Particulars* before mentioned;) Or else an *Oily Iuyce*, which is apter to put out *Flowers*, than *Leaves*.

592

Of *Plants*, some are *Greene* all *Winter*; Others cast their *Leaves*. There are *Greene* all *Winter*; *Holly*, *Iuy*, *Box*, *Firre*, *Eugh*, *Cypresse*, *Iuniper*, *Bayes*, *Rose-Mary*, &c. The Cause of the Holding *Greene*, is the Close and Compact Substance of their *Leaves*, and the *Pedicles* of them. And the Cause of that againe, is either the *Tough* and *Viscous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the first Sort is *Holly*; Which is of so *Viscous a Iuyce*, as they make *Bird-lime* of the *Barka* of it. The *Stalke* of *Iuy* is *Tough*, and not *Fragile*, as we see in other small *Twigs* dry. *Firre* yeeldeth *Pitch*. *Box* is a fast and heavy *Wood*, as we see it in *Bowles*. *Eugh* is a *Strong* and *Tough Wood*, as we see it in *Bowes*. Of the second Sort is *Iuniper*, which is a *Wood* *Odorate*, and maketh a hot *Fire*. *Bayes* is likewise a *Hot* and *Aromaticall Wood*; And so is *Rose-Mary* for a *Shrub*. As for the *Leaves*, their *Density* appeareth, in that, either they are *Smooth* and

and Shining, as in *Bayes, Holly, Ivy, Box, &c.* Or in that they are Hard and Spiry, as in the rest. And Triall would be made of *Grafting* of *Rose-Mary*, and *Bayes*, and *Box*, vpon a *Holly-Stocke*; Because they are *Plants* that come all *Winter*. It were good to try it also with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde-Trees*; To see whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*, because the *Sap* of the *Holly* putteth forth most in the *Winter*. It may be also a *Mezerion-Tree*, grafted vpon a *Holly*, will proue both an *Earlier*, and a *Greater Tree*.

There be some *Plants*, that beare no *Flower*, and yet beare *Fruit*: There be some, that beare *Flowers*, and no *Fruit*: There be some that beare neither *Flowers*, nor *Fruit*. Most of the great *Timber-Trees*, (as *Oakes, Beeches, &c.*) beare no apparent *Flowers*: Some few (likewise) of the *Fruit-Trees*; As *Mulberry, Wall-nut, &c.* And some *Shrubs*, (as *Juniper, Holly, &c.*) beare no *Flowers*. Diuers *Herbs* also beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*; As *Purslane, &c.* Those that beare *Flowers* and no *Fruit*, are few; As the *Double Cherry*, the *Sallow, &c.* But for the *Cherry*, it is doubtfull, whether it be not by *Art*, or *Culture*; For if it be by *Art*, then *Triall* would be made, whether *Apples*, and other *Fruits Blossomes*, may not be doubled. There are some Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars, Box, Brakes, &c.*

There be some *Plants*, that shoot still vpwards, and can *Support* themselves; As the greatest Part of *Trees* and *Plants*: There be some Other, that *Creepe* along the *Ground*; Or *Winde* about other *Trees*, or *Props*, and cannot support themselves; As *Vines, Ivy, Briar, Briomy, Wood-bines, Hop's, Climatis, Camomill, &c.* The Cause is, (as hath beene partly touched,) for that all *Plants*, (naturally) moue vpwards; But if the *Sap* put vp too fast, it maketh a slender *Stalke*, which will not support the weight: And therefore these latter Sort are all *Swift* and *Hasty* *Commers*.

The first and most Ordinary *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the best; And next, the *Dung* of *Kine*: And thirdly, that of *Horses*: Which is held to be somewhat too hot, vnlesse it be mingled. That of *Pigeons* for a Garden, or a small Quantity of *Ground*, excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Anable*, to spread it immediately before the *Ploughing* and *Sowing*; And so to *Plough* it in: For if you spread it long before, the *Sunne* will draw out much of the *Fatnesse* of the *Dung*: If the *Ground* be *Grazing Ground*, to spread it somewhat late, towards *Winter*; That the *Sunne* may haue the lesse *Power* to dry it vp. As for speciall *Composts* for *Gardens*, (as a *Hot Bed, &c.*) we haue handled them before.

The Second Kind of *Compost*, is, the *Spreading* of diuers *Kinds* of *Earths*; As *Marle, Chalke, Sea-Sand, Earth* vpon *Earth, Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the best; As hauing most *Fatnesse*;

Experiments
in Consort
touching all
Manner of
Composts, and
Helps of *Ground*.

595

892

596

And not Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Rudiment of life. *Chalke* ouer-heateth the *Ground* a little. And therefore is best vpon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say, that it was a common Errour, to thinke that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: But that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterwards it will beare little *Grasse*, because the *Ground* is tired out. It were good to try the laying of *Chalke* vpon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it must be Friable first, by Raine, or Lying: As for *Earth*, it *Cōpasse* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred vpon it; And it did beare *Fruit* excellently the first yeare of the Planting: For the *Surface* of the *Earth* is euer the Fruitfullest. And *Earth* so prepared hath a double *Surface*. But it is true, as I cōceive, that such *Earth*, as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the *Sunne*, and the *Growth* of *Vegetables*. And therefore, if you make a large *Houell*, thatched, ouer some Quantity of *Ground*; Nay if you doe but *Plancke* the *Ground* ouer, it will breed *Salt-petre*. As for *Pond-Earth*, or *Riuer-Earth*, it is a very good *Compost*; Especially if the *Pond* haue beene long vncleansed, and so the *Water* be not too Hungry: And I iudge it will be yet better, if there be some *Mixture* of *Chalke*.

597

The Third *Helpe* of *Ground*, is, by some other *Substances*, that haue a Vertue to make *Ground* Fertile; though they be not meere *Earth*: wherein *Ashes* excell; In so much as the Countries about *Aetna*, and *Vesunius*, haue a kinde of Amends made them, for the Mischiefe the Eruptions (many times) doe, by the exceeding *Fruitfulnessse* of the *Soyle*, caused by the *Ashes*, scattered about. *Soot* also, though thinne spred, in a *Field*, or *Garden*, is tried to be a very good *Compost*. For *Salt*, it is too Costly: But it is tryed, that mingled with *Seed-Corne*, and sowed together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all ouer. As for the *Sleeping* of the *Seeds*, in seuerall *Mixtures* with *Water*, to giue them Vigour; Or *Watring* *Grounds* with *Compost-Water*; We haue spoken of them before.

598

The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables* to dye into the *Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease*. *Brakes* cast vpon the *Ground*, in the Beginning of *Winter*, will make it very Fruitfull. It were good (also) to try, whether *Leaves* of *Trees* swept together, with some *Chalke* and *Dung* mixed, to giue them more Heart, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lye scattered, and without *Mixture*, they rather make the *Ground* soure, than otherwise.

The

The Fifth *Helpe* of *Ground*, is *Heat* and *Warmth*. It hath beene anciently practised to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, vpon the *Ground*: Wee see, that *Warmth* of *Walls* and *Enclosures*, mendeth *Ground*: Wee see also that *Lying open* to the *South*, mendeth *Ground*: Wee see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *Compost*: And it may be doubted, whether the *Couering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof we spake in the last *Experiment*,) helpeth it not, by reason of the *Warmth*. Nay some very good *Husbands* doe suspect, that the *Gathering* vp of *Flints*, in *Flinty Ground*, and *Laying* them on *Heapes*, (which is much vsed,) is no good *Husbandry*; For that they would keep the *Ground* *Warme*.

The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting out Waters*, at seasonable Times: For *Water*, at some Seasons, and with reasonable stay, doth good; But at some other Seasons, and with too long Stay, doth hurt. And this serueth onely for *Meadowes*, which are along some *Riuer*. The other way is, to bring *Water*, from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it traueserle to spread the *Water*. And this maketh an excellent Improvement, both for *Corne*, and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the *Fatnesse* of the *Earth*: But howsoeuer it profiteth much. Generally, where there are great *Ouerflowes*, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground* warme, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *Water* may not stay too long in the *Spring*, til the *Weeds* and *Sedge* be growne vp; For then the *Ground* will be like a *Wood*, which keepeth out the *Sunne*; And so continueth the *Wet*; Whereby it will neuer graze (to purpose) that yeare. Thus much for *Irrigation*.

But for *Anoydances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, wee shall speake of them in another Place.

NATVRALL HISTORIE.

VII. Century.



In the Differences betweene *Animate* and *Inanimate Bodies*, we shall handle fully vnder the Title of *Life*, and *Living Spirits*, and *Powers*. We shall therefore make but a brieue Mention of them in this Place. The Maينه Differences are two. All *Bodies* haue *Spirits*, and *Pneumaticall Parts* within them: But the Maينه Differences betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits* of *Things Animate*, are all Continued with themselves, and are Branched in *Veines*, and secret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* haue not only *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not peruious one to another; As *Aire* is in *Snow*. The Second Maينه Difference is, that the *Spirits* of *Animate Bodies*, are all in some degree, (more or lesse,) kindled and inflamed; And haue a fine *Commixture* of *Flame*, and an *Aëriall Substance*. But *Inanimate Bodies* haue their *Spirits* no whit *Inflamed*, or *Kindled*. And this Difference consisteth not in the *Heat* or *Coolenesse* of *Spirits*; For *Cloues* and other *Spices*, *Naphtha* and *Petroleum*, haue exceeding *Hot Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of those Weake and Temperate *Bodies* come

Experiments
in Consort,
touching the
Affinities, and
Differences, be-
tweene *Plants*
and *Inanimate*
Bodies.

601

to be Inflamed, then they gather a much greater *Heat*, than others haue *Un-inflamed*; besides their *Light*, and *Motion*, &c.

602

The *Differences*, which are *Secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They haue an *Accretion*, but no *Alimentation*. Thirdly, *Plants* haue a *Period of Life*; which *Inanimate Bodies* haue not. Fourthly, they haue a *Succession*, and *Propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

603

The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those foure before mentioned, (For *Metalls* I hold *Inanimate*), are these: First, *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part aboue *Earth*, and part vnder *Earth*.

604

There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Nearest of both *Kindes*: Another is *Vitrioll*, for that is aptest to sprout with *Moisture*.

605

Another speciall *Affinitie* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it dissolue not in *Arefaction*) will in the end issue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Mosse*, and *Mushromes*, and *Agaricke*, and other of those kindes, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselves, and a Number of other things, after a *Mouldnesse*, or *Rottenesse*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which haue *Affinitie* with *Plants*, haue this *Difference* from them; That they haue no *Succession* or *Propagation*, though they *Nourish*, and haue a *Period of Life*, and haue likewise some *Figure*.

606

I left once, by chance, a *Citron* cut, in a close Roome, for three Summer-Moneths, that I was absent; And at my Returne, there were grown forth, out of the Pith cut, *Tufts of Haires*, an Inch long, with little blacke Heads, as if they would haue beene some *Herbe*.

Experiments
in Consort
touching the
Affinities, and
Differences, of
Plants, and *Li-
ving Creatures*:
And the *Confi-
ners* and *Parti-
cles* of them.

607

The *Affinities* and *Differences* betweene *Plants* and *Living Creatures*, are these that follow. They haue both of them *Spirits Continued*, and *Branched*, and also *Inflamed*: But first in *Living Creatures*, the *Spirits* haue a *Cell* or *Seat*, which *Plants* haue not; As was also formerly said: And secondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And these two are the *Radicall Differences*. For the *Secondary Differences*, they are as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are seuered, and of themselves. Secondly, *Living Creatures* haue *Locall Motion*; *Plants* haue not. Thirdly, *Living Creatures* nourish from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Roots*. Fourthly, *Plants* haue their *Seed* and *Seminall Parts* vppermost; *Living Creatures* haue

haue them lower-most: And therefore it was said, not elegantly alone, but Philosophically; *Homo est Planta inuersa*; Man is like a Plant turned upwards: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* haue a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* haue more *Diversity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* haue. Seuenthly, *Living Creatures* haue *Sense*, which *Plants* haue not. Eighthly, *Living Creatures* haue *Voluntary Motion*, which *Plants* haue not.

For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name distinguished; As *Male-Piony*, *Female-Piony*; *Male-Rose-mary*, *Female-Rose-mary*; *Hee-Holly*, *Shee-Holly*; &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The nearest Approach of it, is between the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neare, incline the One to the other: In so much as, (that which is more strange,) they doubt not to report, that to keepe the *Trees* vp-right from Bending, they tye *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enioyed by the *Contact* of a *Middle Body*. But this may be Faigned, or at least Amplified. Neuerthelesse, I am apt enough to thinke, that this same *Binarium* of a Stronger and a Weaker, like vnto *Masculine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, wherein no *Markes* of *Distinction* appeare: And it is doubled sometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in most *Species*.

The *Participles* or *Confiners* betweene *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and haue no *Locall Motion* of *Remoue*, though they haue a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a Fabulous Narration, that in the *Northerne Countries*, there should be an *Herbe* that groweth in the likenesse of a *Lambe*, and feedeth vpon the *Grasse*, in such sort, as it will bare the *Grasse* round about. But I suppose, that the *Figure* maketh the *Fable*; For so we see, there be *Bee-Flowers*, &c. And as for the *Grasse*, it seemeth the *Plant*, hauing a great *Stalke* and *Top*, doth prey vpon the *Grasse*, a good way about, by drawing the *Iuyce* of the *Earth* from it.

The *Indian Fig* boweth his *Roots* downe so low, in one yeare, as of it selfe it taketh *Root* againe: And so multiplieth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The *Cause* is the *Plenty* of the *Sap*, and the *Softnesse* of the *Stalke*, which maketh the *Bough*, being over-loaden, and not stiffely vpheld, weigh downe. It hath *Leaves*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cause* is, for that the *Continuall Shade* increaseth the *Leaves*, and abateth the *Fruit*; which neuerthelesse is of a pleasant Taste. And that (no doubt) is caused, by the *Supplenesse* and *Gentlenesse* of the *Iuyce* of that *Plant*, being that which maketh the *Boughes* also so Flexible.

It is reported by one of the *Ancients*, that there is a certaine *Indian Tree*,

608

609

Experiments
Promiscuous
touching
Plants.

610

611

Tree, hauing few, but very great, *Leaves*, three Cubits long, and two broad; And that the *Fruit*, being of good Taste, groweth out of the *Barke*. It may be, there be *Plants*, that poure out the *Sap* so fast, as they haue no leisure, either to diuide into many *Leaves*, or to put forth *Stalks* to the *Fruit*. With vs *Trees* (generally) haue small *Leaves*, in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the Least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaves* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Cole-wort*. The Cause is, (like to that of the *Indian Fig*.) the hasty and plentifull Putting forth of the *Sap*.

612 There be three *Things* in vse for *Sweetnesse*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little vsed. It is found in *Canes*: *Quare*, whether to the first *Knuckle*, or further vp? And whether the very *Barke* of the *Cane* it selfe do yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I haue heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that he hath knowne in the beginning of *May*, *Honey-Combs* empty of *Honey*; And within a fortnight, when the *Sweet Dewes* fall, filled like a *Cellar*. It is reported also by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleys of *Hyrkania*, that distilleth *Honey* in the *Mornings*. It is not vnlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may be also, that some sweet Iuyces, fit for many vses, may be concocted out of *Fruits*, to the Thickness of *Honey*, or perhaps of *Sugar*; The likeliest are *Raisins* of the *Sunne*, *Figs*, and *Corrans*: The Meanes may be enquired.

613 The *Ancients* report of a *Tree*, by the *Persian Sea*, vpon the *Shore-Sands*, which is nourished with the *Salt-Water*; And when the *Tide* ebbereth, you shall see the *Roots*, as it were, bare without *Barke*, (being as it seemeth corroded by the *Salt*.) & grasping the *Sands* like a *Crab*; Which neuertheless beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by setting them within the *Sands*.

614 There be of *Plants*, which they vse for *Garments*, these that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter, commonly; And sometimes the *Downe* that groweth aboue.

615 They haue, in some *Countries*, a *Plant* of a *Rosy Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that *Sleepeth*. There be *Sleepers* enow then; For almost all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that haue a *Mossy* or *Downy Root*; And likewise that haue a Number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches* and *Impostours* make an vgly *Image*, giuing it the Forme of a *Face* at the *Top* of the *Root*, and leaue those *Strings* to make a broad *Beard* downe to the *Foot*. Also there is a Kinde of *Nard*, in *Creet*, (being a Kinde of *Pha*) that hath a *Root* hairy, like a *Rough-Footed-Dones* foot.

foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the Sap hasteneth most to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That besides the Putting forth vpwards, and downwards, putteth forth in Round.

There are some *Teares of Trees*, which are kembed from the *Beards of Goats*: For when the *Goats* bite and crop them, especially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth vpon their *Beards*: Of this Sort is some kinde of *Ladanum*. 617

The *Irrigation* of the *Plaine-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewise with *Roots*; For vpon *Seeds* it worketh no great Effects. 618

The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessells*. But if the *Vessells* be not very Great, you must make some Holes in the Bottome, to giue some Refreshment to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate. 619

The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thrue: Neither did it loue the Sunne: There might be one Cause of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quare* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things. 620

It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins* of *Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe deuoure the *Pith* and *Marrow* of it, and so make it Hollow; But meddle not with the *Barke*, because to them it is bitter. 621

There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than we know any; For there haue beene *Cups* made of them, and an *Image* of *Iupiter*. But it is like they were *Wilde-Vines*; For the *Vines*, that they vse for *Wine*, are so often Cut, and so much Digged and Dressed, that their Sap spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twigges*, while they are Greene, so brittle, yet the *Wood* dryed is extreme Tough; And was vsed by the *Captaines* of *Armies*, amongst the *Romans*, for their *Cudgells*. 622

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading vpon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make tryall, whether *Plants* that vse to be borne vp by Props, will not put forth greater *Leaues*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Iuy*, *Wood-bine*, &c. 623

Quinces, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But because *Honey* (perhaps) will giue them a Taste Ouerluscious, 624

lushious, it were good to make Triall in *Powder of Sugar*; Or in *Syrup of Wine* onely Boyled to Height. Both these would likewise be tried in *Orenge*s, *Lemons*, and *Pomgranats*; For the *Powder of Sugar*, and *Syrup of Wine*, will serue for more times than once.

625 The *Conseruation of Fruit* would be also tried in *Vessells*, filled with *fine Sand*, or with *Powder of Chalke*; Or in *Meale* and *Flower*; Or in *Dust of Oake-wood*; Or in *Mill*.

626 Such *Fruits*, as you appoint for *Long Keeping*, you must gather before they be full *Ripe*; And in a *Faire* and *Dry Day*, towards *Noone*; And when the *Wind* bloweth not *South*; And when the *Moone* is vnder the *Earth*; And in *Decrease*.

627 Take *Grapes*, and hang them in an *Empty Vessel*, well Stopped; And set the *Vessel*, not in a *Cellar*, but in some dry *Place*; And it is said, they will last long. But it is reported by some, they will keepe better, in a *Vessel* halfe full of *Wine*, so that the *Grapes* touch not the *Wine*.

628 It is reported, that the *Preseruing* of the *Stalke*, helpeth to preserue the *Grape*; Especially if the *Stalke* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

629 It is reported by some of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let downe into *Wells* vnder *Water*, will keepe long.

630 Of *Herbs* and *Plants*, some are good to eat *Raw*; As *Lettuce*, *Endiue*, *Purslane*, *Tarragon*, *Cresses*, *Cucumbers*, *Muske-Melons*, *Radish*, &c. Others onely after they are *Boyled*, or haue *Passed the Fire*; As *Parsley*, *Clary*, *Sage*, *Parsnips*, *Turnips*, *Asparagus*, *Artichoakes*, (though they also being young are eaten *Raw*;) But a Number of *Herbs* are not *Esculent* at all; As *Worme-wood*, *Grasse*, *Greene-Corne*, *Centory*, *Hyssope*, *Lawender*, *Balmie*, &c. The *Causes* are, for that the *Herbs*, that are not *Esculent*, do want the two *Tastes*, in which *Nourishment* resteth; Which are, *Fat*, and *Sweet*; And haue (contrariwise) *Bitter* and *Ouer-strong Tastes*, or a *Iuyce* so *Crude*, as cannot be ripened to the degree of *Nourishment*. *Herbes* and *Plants*, that are *Esculent Raw*, haue *Fatnesse*, or *Sweetnesse*, (as all *Esculent Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it must be such a *Fatnesse*, (for as for *Sweet Things*, they are in effect alwayes *Esculent*;) as is not *Ouer-grosse*, and *Loading* of the *Stomach*; For *Parsnips* and *Leeks* haue *Fatnesse*; But it is too *Grosse* and *Heauy* without *Boyling*. It must be also in a *Substance* somewhat *Tender*; For we see *Wheat*, *Barley*, *Artichoakes*, are no good *Nourishment*, till they haue *Passed the Fire*; But the *Fire* doth ripen, and maketh them soft and tender, and so they become *Esculent*. As for *Radish*, and *Tarragon*, and the like, they are for *Condiments*, and not for *Nourishment*. And euen some of those *Herbes*, which are not *Esculent*, are notwithstanding *Poculent*; As *Hop's*, *Broome*, &c. *Quære* what *Herbs* are good for *Drinke*, besides the two aforenamed; For that it may (perhaps) ease the Charge of *Brewing*, if they make *Beere* to require lesse *Malt*, or make it last longer.

631 *Parts* fit for the *Nourishment* of *Man*, in *Plants*, are, *Seeds*, *Roots*, and *Fruits*; But chiefly *Seeds*, and *Roots*. For *Leaues*, they giue no *Nourishment*,

ment, at all, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oily* and *Watry Substance* commixed,) haue more of the *Oily Substance*; And *Leaues*, *Flowers*, &c. of the *Watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth euer in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Graines*, (we see) are halfe a yeare, or more, in *Concocting*; Whereas *Leaues* are out, and Perfect in a Moneth.

Plants (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe*, and *Root*. The Cause is, for that in *Plants*, that are not of a Fierce and Eager Spirit, the Vertue is increased by *Concoction*, and *Maturation*, which is euer most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilst the Spirit is enclosed in the *Root*; And the Spirits doe but weaken, and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlicke*, *Dragon*, &c. Nay there be *Plants*, that haue their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *Inspide*; As *Ginger*. The Cause is (as was touched before,) for that the *Heat* of those *Plants* is very Dissipable; which vnder the *Earth* is contained and held in; But when it commeth to the *Aire*, it exaleth.

The *Iuyces* of *Fruits* are either *Watry*, or *Oily*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Peare*, the *Cherry*, the *Pomgranate*, &c. And there are some others, which, though they be not in vse for *Drinke*, yet they appeare to be of the same *Nature*; As *Plummes*, *Sernices*, *Malberries*, *Rasps*, *Orenges*, *Lemons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculag admistis imitantur vitea Sorbis.

And it may be *Heps* and *Brier-Berries* would doe the like. Those that haue *Oily Iuyce*, are; *Olines*, *Almonds*, *Nuts* of all sorts, *Pine-Apples*, &c. And their *Iuyces* are all *Inflammable*. And you must obserue also, that some of the *Watry Iuyces*, after they haue gathered *Spirit*, will Burne and Enflame; As *Wine*. There is a Third Kinde of *Fruit*, that is sweet, without either *Sharpnesse*, or *Oyline*: Such as is the *Fig*, and the *Date*.

It hath beene noted, that most *Trees*, and specially those that beare *Mast*, are fruitfull but once in two yeares. The Cause (no doubt) is, the *Expence* of *Sap*; For many *Orchard-Trees*, well Cultured, will beare diuers yeares together.

There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many *Bastard-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are *Inflammable*; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misseltoe*, though rarely. The Cause of all these may be, the *Closenesse* and *Solidenesse* of the *Wood*, and *Pith* of the *Oake*; Which maketh seuerall *Iuyces* finde seuerall *Eruptions*. And therefore, if

if you will deuise to make any *Super-Plants*, you must euer giue the *Sap* Plentifull Rising, and Hard Issue.

636

There are two *Excrescences*, which grow vpon *Trees*; Both of them in the Nature of *Mushromes*: The one the *Romans* called *Boletus*; Which groweth vpon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we haue spoken before,) which groweth vpon the *Tops* of *Oakes*; Though it be affirmed by some, that it groweth also at the *Roots*. I doe conceiue, that many *Excrescences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into some *Preternaturall Substance*.

637

The greater Part of *Trees* beare *Most*, and *Best*, on the *Lower Boughs*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But some beare *Best* on the *Top-Boughs*; As *Crabs*, &c. Those that beare best below, are such, as *Shade* doth more good to, than *Hurt*. For generally all *Fruits* beare best lowest; Because the *Sap* tieth not, hauing but a short *Way*: And therefore in *Fruits* spred vpon *Walls*, the *Lowest* are the *Greatest*, as was formerly said; So it is the *Shade* that hindereth the *Lower Boughs*; Except it be in such *Trees*, as delight in *Shade*; Or at least beare it well. And therefore, they are either *Strong Trees*, as the *Oake*; Or else they haue large *Leaues*, as the *Walnut* and *Fig*; Or else they grow in *Pyramis*, as the *Pear*. But if they require very much *Sunne*, they beare best on the *Top*; As it is in *Crabs*, *Apples*, *Plummes*, &c.

638

There be *Trees*, that beare best, when they begin to be *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that giue *Mast*. The *Cause* is, for that all *Trees* that beare *Mast*, haue an *Oily Fruit*; And *Young Trees* haue a more *Watry Iuyce*, and lesse *Concocted*; And of the same kinde also is the *Almond*. The *Pear* likewise, though it be not *Oily*, yet it requireth much *Sap*, and well *Concocted*; For we see it is a *Heauy Fruit*, and *Solide*; Much more than *Apples*, *Plummes*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *Wine*, when it is *Old*; For that the *Iuyce* is better *Concocted*: And wee see that *Wine* is *Inflammable*; So as it hath a kinde of *Oylineffe*. But the most Part of *Trees*, amongst wich are *Apples*, *Plummes*, &c. beare best when they are *Young*.

639

There be *Plants*, that haue a *Milke* in them, when they are *Cut*; As *Figs*, *Old Lettuce*, *Sowe-Thistles*, *Spurge*, &c. The *Cause* may be an *Inception* of *Putrefaction*; For those *Milkes* haue all an *Acrimony*; though one would thinke they should be *Lenitive*. For if you write vpon *Paper*, with the *Milke* of the *Fig*, the *Letters* will not be scene, vntill you hold the *Paper* before the *Fire*, and then they wax *Browne*; Which sheweth that it is a *Sharpe* or *Fretting Iuyce*: *Lettuce* is thought *Poysonous*, when it is so *Old*, as to haue *Milke*; *Spurge* is a kinde of *Poyson* in it *Selfe*; And as for *Sowe-Thistles*, though *Coneyes* eat them, yet *Sheepe* and *Cattell* will not touch them; And besides the *Milke* of them, rubbed vpon *Warts*, in short time, weareth them away: Which sheweth the *Milke* of

of them to be *Corrosive*. We see also, that *Wheat*, and other *Cornes sown*, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is euer a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

Mushromes are reported to grow, as well vpon the *Bodies* of *Trees*, as vpon their *Roots*, or vpon the *Earth*: And especially vpon the *Oake*. The *Cause* is, for that *Strong Trees*, are towards such *Excrecences*, in the Nature of *Earth*; And therefore put forth *Mosse*, *Mushromes*, and the like.

There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Eare*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Island Soquotra*: The *Herb Amaranthus*, (indeed,) is *Red* all ouer; And *Brassill* is *Red* in the *Wood*: And so is *Red Sanders*. That *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-loafe*. It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For wee see that *Grapes*, and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*; Because the *Iuyce* hasteneth not vp; And besides it is very *Astringent*; And therefore of *Slow Motion*.

It is reported, that *Sweet Mosse*, besides that vpon the *Apple-Trees*, groweth likewise (sometimes) vpon *Poplars*; And yet (generally) the *Poplar* is a *Smooth Tree* of *Bark*, and hath little *Mosse*. The *Mosse* of the *Larix Tree* burneth also *Sweet*, and sparkleth in the *Burning*. *Quere* of the *Mosses* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloës*, &c.

The *Death* that is most without *Paine*, hath been noted to be, vpon the *Taking* of the *Potion* of *Hemlocke*; which in *Humanity* was the *Forme* of *Execution* of *Capitall Offenders* in *Athens*. The *Payson* of the *Aspe*, that *Cleopatra* vsed, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the *Strife* of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extreme *Old Man*. I conceiue it is lesse *Painfull* than *Opium*, because *Opium* hath *Parts* of *Heat* mixed.

There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are *Sweet* before they ripen, and after grow *Spicy*. And some neuer *Ripen* to be *Sweet*; As *Tamarinds*, *Berberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former Kinde haue much and subtil *Heat*, which causeth *Earely Sweetnesse*; The latter haue a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath *Parts* of *Contrary Natures*; For it is *Sweet*, and yet *Astringent*.

There be few *Herbes* that haue a *Salt Tasse*; And contrariwise all *Bloud* of *Living Creatures* hath a *Saltnesse*: The *Cause* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the *Originall Tasse* remaineth

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remaineth not; For you shall haue them *Bitter, Sowre, Sweet, Biting*, but seldome *Salt*: But in *Living Creatures*, all those *High Tastes* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Oily Nature*; which is not very *Susceptible* of those *Tastes*; And the *Saltnesse* it selfe of *Bloud*, is but a light, and secret *Saltnesse*: And euen among *Plants*, some doe participate of *Saltnesse*, as *Alga Marina, Sampire, Scoruy-Grasse, &c.* And they report, there is, in some of the *Indian-Seas*, a *Swimming Plant*, which they call *Salga-lus*, spreading ouer the *Sea*, in such sort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Ashes* of all *Plants*, they extract a *Salt*, which they vse in *Medicines*.

646

It is reported by one of the *Ancients*, that there is an *Herb* growing in the *Water*, called *Lincoſtis*, which is full of *Prickles*: This *Herbe* putteth forth another small *Herbe* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered betweene the *Prickles*, which *Putrified* by the *Sunne*, *Germinateth*. But I remember also I haue seene, for a great *Rarity*, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallants*.

647

Barley, (as appeareth in the *Malting*,) being steeped in *Water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned vpon a dry floare, will sprout, halfe an *Inch* long at least: And if it be let alone, and not turned, much more; vntill the *Heart* be out. *Wheat* will doe the same. Try it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vine*; For there it is of the old *Store*, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would be further driuen: For it appeareth already, by that which hath beene said, that *Earth* is not necessary to the first *Sprouting* of *Plants*; And we see that *Rose-Buds* set in *Water*, will *Blow*: Therefore try whether the *Sprouts* of such *Graines* may not be raised to a further *Degree*; As to an *Herbe*, or *Flower*, with *Water* onely; Or some small *Commixture*, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come far faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may giue some light also, that *Drinke* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drinke* together. Try the same *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then dry it, and see whether it will sprout.

648

Malt in the *Drenching* will swell; And that in such a manner, as after the *Putting* forth in *Sprouts*, and the *drying* vpon the *Keele*, there will be gained at least a *Busshell* in eight, and yet the *Sprouts* are rubbed off; And there will be a *Busshell* of *Dust* besides the *Malt*: Which I suppose to be, not onely by the loose, and open *Laying* of the *Parts*, but by some *Addition* of *Substance*, drawne from the *Water*, in which it was steeped.

649

Malt gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in

in the Wort. The *Dulcoration* of Things is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of Things *Inalimentall*, to become *Alimentall*, may be an Experiment of great Profit, for Making new *Victuall*.

Most *Seeds* in the Growing, leaue their *Huske* or *Rinde* about the *Root*; But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The Cause may be, for that the *Skin* or *Huske* is not easie to breake; As we see by the Pilling of *Onions*, what a Holding Substance the *Skin* is.

Plants, that haue *Curled Leauers*, doe all abound with *Moisture*; Which commeth so fast on, as they cannot spread themselves *Plaine*; but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full grown, and *Cabbage-Lettuce*.

It is reported, that *Firre*, and *Pine*, especially if they be *old* and *putrified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like *Hard Sugar*.

The *Roots* of *Trees* doe, (some of them,) put downwards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*; As the *Ash*, *Cypresse-Tree*, *Oline*, &c. The Cause of this latter may be, for that such *Trees* as loue the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot vp much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason, vnder *Ground*, to auoid Recesse from the *Sunne*, maketh them spread the more. And wee see it commeth to passe in some *Trees*, which haue beene planted too deepe in the *Ground*, that for loue of Approach to the *Sunne*, they forsake their first *Root*, and put out another more towards the Top of the *Earth*. And wee see also, that the *Oline* is full of *Oylie Iuyce*; And *Ash* maketh the best Fire; And *Cypresse* is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loueth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they haue so much *Heat* in themselves, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also, that haue the same difference; As the *Herbe* they call *Monsus Diaboli*; Which putteth the *Root* downe so low, as you cannot pull it vp without *Breaking*; Which gaue Occasion to the Name, and *Fable*; For that it was said, it was so wholesome a *Root*, that the *Deuill*, when it was gathered, bit it for *Enuy*: And some of the *Ancients* doe report, that there was a Goodly *Firre*, (which they desired to remoue whole,) that had a *Root* vnder *Ground* eight Cubits deepe; And so the *Root* came vp broken.

It hath beene obserued, that a *Branch* of a *Tree*, being *Unbarked* some space at the Bottom, and so set into the *Ground*, hath growen; Euen of such *Trees*, as if the *Branch* were set with the *Barke* on, they would not grow; yet contrariwise we see, that a *Tree* Pared round in the *Body*, above

Ground, will die. The Cause may be, for that the *Vnbarkt Part* draweth the Nourishment best, but the *Barke* continueth it only.

655 Grapes will continue *Fresh*, and *Moist*, all Winter long, if you hang them, *Cluster by Cluster*, in the *Roofe* of a *Warme Roome*; Especially, if when you gather the *Cluster*, you take off with the *Cluster* some of the *Stocke*.

656 The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath these Properties; That it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughs*, though many *Stalkes* come out of one *Root*. It differeth much in *Greatnesse*; The smallest being fit for *Thatching* of *Houses*; And *Stopping* the *Chinkes* of *Ships*; Better than *Glew*, or *Pitch*. The *Second Bignesse*, is used for *Angle-Rods*, and *Staves*; And in *China* for beating of *Offenders* vpon the *Thighs*. The differing *Kindes* of them are; The *Common Reed*; The *Cassia Fistula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *Water*, it draweth most Nourishment from *Water*; which maketh it the *Smoothest* of all others in *Barke*; And the *Hollowest* in *Body*.

657 The *Sap* of *Trees*, when they are let *Blond*, is of differing *Natures*. Some more *Watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thicke*; As *Apples*. Some *Gummie*; As *Cherries*. Some *Froathie*, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* only; For if you cut the *Tree*, a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be drie. The *Trees*, which haue the *Moistest Iuyces* in their *Fruit*, haue commonly the *Moistest Sap* in their *Body*; For the *Vines* and *Peares* are very *Moist*; *Apples* somewhat more *Spongie*: The *Milke* of the *Figge* hath the *Qualitie* of the *Rennet*, to gather *Cheese*: And so haue certaine *Soure Herbs* wherewith they make *Cheese* in *Lent*.

658 The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*: And it is a good *Triall*, to trie it by *Speaking* at one *End*, and *Laying* the *Eare* at the *Other*: For if it be *Knottie*, the *Voice* will not passe well. Some haue the *Veines* more varied, and chamlotted; As *Oake*, whereof *Wainscot* is made; *Maple*, whereof *Trenchers* are made: Some more smooth, as *Firre*, and *Walnut*: Some doe more easily breed *Wormes* and *Spiders*; Some more hardly, as it is said of *Irish Trees*: Besides, there be a Number of Differences that concerne their *Vse*; As *Oake*, *Cedar*, and *Chestnut*, are the best *Builders*: Some are best for *Plough-Timber*; As *Ashe*: Some for *Peeres*, that are sometimes wet, and sometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Desks*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moist Grounds*; For that maketh the *Timber* *Tough*, and not apt to rift with *Ordnance*; Wherein *Englisb* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre*, and *Pine*, because of their *Length*,

Length, Straightnesse, and Lightnesse : Some for *Pale* ; As *Oake* : Some for *Fuell* ; As *Ash* : And so of the rest.

The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casual* : For many haue beene translated, and haue prospered well ; As *Damaske-Roses*, that haue not beene knowne in *England* aboue an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerly *Naturall* ; As the *Firre* and *Pine* loue the *Mountaines* ; The *Poplar*, *Willow*, *Sallow*, and *Alder*, loue *Riuers*, and *Moist Places* : The *Ash* loueth *Coppices* ; But is best in *Standards* alone : *Iuniper* loueth *Chalke* ; And so doe most *Fruit-Trees* : *Sampire* groweth but vpon *Rocks* : *Reeds* and *Osiers* grow where they are washed with *Water* : The *Vine* loueth *Sides of Hills*, turning vpon the *South-East Sun*, &c.

The *Putting forth* of certaine *Herbs* discovereth of what *Nature* the *Ground* where they put forth, is : As *wilde Thyme* sheweth good *Feeding Ground* for *Cattell* : *Betony* and *Strawberries* shew *Grounds* fit for *Wood* : *Camomill* sheweth *Mellow Grounds* fit for *Wheat* . *Mustard Seede*, growing after the *Plough*, sheweth a good *Strong Ground* also for *Wheat* : *Burnet* sheweth good *Meadow* : And the like.

There are found, in diuers *Countries*, some other *Plants*, that grow out of *Trees* and *Plants*, besides *Misseltæe* : As in *Syria*, there is an *Herbe* called *Cassytas*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth ; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Faunos*, vpon the *Wilde Olive*. And an *Herbe* called *Hippophaston* vpon the *Fullers Thorne* ; Which, they say, is good for the *Falling-Sicknesse*.

It hath beene obserued, by some of the *Ancients*, that howsoeuer *Cold* and *Easterly Winds*, are thought to be great *Enemies* to *Fruit* ; yet neuerthelesse *South-Winds* are also found to doe *Hurt* ; Especially in the *Blossoming* time ; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West Winds* are the best. It hath beene obserued also that *Greene* and *Open Winters* doe hurt *Trees* ; Insomuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will dye. The *Cause* is the same with the former, because the *Lust* of the *Earth* ouerspendeth it selfe ; Howsoeuer some other of the *Ancients* haue commended *Warne Winters*.

Snowes, lying long, cause a *Fruitfull Yeare* : For first, they keepe in the *Strength* of the *Earth* ; Secondly, they water the *Earth*, better than *Raine* ; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Teate*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture* ; For it is the *Froth* of the *Cloudy Waters*.

Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits* ; As *Vines*, *Olines*, *Pomegranates* ; Yet it is rather for *Plenty*, than for *Goodnesse* ; For the best *Wines* are in the *Driest Vintages* : *Small Showers* are likewise good for *Corne*, so as

659

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Parching Heats come not vpon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *Sunne* followeth not so fast vpon them: And we see, euen in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Euening*.

665

The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently inquired. The *Earth*, that with *Showers* doth easiliest *Softten*, is commended; And yet some *Earth* of that kinde will be very *Dry*, and *Hard* before the *Showers*. The *Earth* that casteth vp from the *Plough*, a *Great Clod*, is not so good, as that, which casteth vp a *Smaller Clod*. The *Earth*, that putteth forth *Mosse* easily, and may bee called *Mouldy*, is not good. The *Earth*, that smelleth well vpon the *Digging*, or *Ploughing*, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-Bowes*, fall more vpon one kinde of *Earth* than vpon another: As it may well be; For that that *Earth* is most *Roside*: And therefore it is commended for a *Signe* of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *Withered*, or *Blasted* at the *Top*, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sun*, and *Toasted*, is commonly *Forced Earth*, and *Barren* in his owne *Nature*. The *Tender*, *Cheffome*, and *Mellow Earth*, is the best; Being meere *Mould*, betweene the two *Extreames* of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Ploughed*, is commonly *Fruitfull*; For it is *Cleaving*, and full of *Iuyce*.

666

It is strange, which is obserued by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnessse* of *Trees*; And of *Vines*, by name: Insomuch as they cast *Dust* vpon them of purpose. It should seeme, that that *Powdring*, when a *Shower* commeth, maketh a kinde of *Soyling* to the *Tree*, being *Earth* and *Water*, finely laid on. And they note, that *Countries*, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667

It is commended by the *Ancients*, for an *Excellent Helpe* to *Trees*, to lay the *Stalks* and *Leaues* of *Lupines* about the *Roots*; Or to *Plough* them into the *Ground*, where you will sowe *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them vpon *land*, doth much *Good*. And it was generally receiued of old, that the *Dunging* of *Grounds*, when the *West Wind* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more *thirsty*, and open, to receiue the *Dung*.

668

The *Grafting* of *Vines* vpon *Vines*, (as I take it,) is not now in vse: The *Ancients* had it, and that three wayes: The First was *Insition*, which is the Ordinary Manner of *Grafting*: The Second was *Terebration*, through the *Middle* of the *Stocke*, and *Putting* in the *Cions* there: And the Third was *Paring* of two *Vines*, that grow together, to the *Marrow*, and *Binding* them close.

669

The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And

And would be more worthy to be enquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedied. The *Mildew* is one of the Greatest; which (out of question) commeth by *Closetnesse* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it seldom commeth; Such as is with vs *York's Woald*. This cannot be remedied, otherwise than that in *Countries* of Small Enclosure, the *Grounds* be turned into larger *Fields*: Which I haue knowne to doe good in some *Farmes*. Another *Disease* is the *Putting forth* of *Wilde Oats*, whereinto *Corne* oftentimes, (especially *Barley*,) doth degenerate. It happeneth chiefly from the *Weaknesse* of the *Graine* that is sown; For if it be either too Old, or Mouldy, it will bring forth *Wilde Oats*. Another *Disease* is the *Society* of the *Ground*; For if you sow one *Ground* still with the same *Corne*, (I meane not the same *Corne* that grew vpon the same *Ground*,) but the same *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c.) it will prosper but poorly: Therefore besides the *Resting* of the *Ground*, you must vary the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times; At the *Flouring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with vs is rare; But in Hotter *Countries*, common: Infomuch as the Word, *Calamitas*, was first deriued from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Ouer-wet* at *Sowing-Time*; which with vs breedeth much *Dearth*; Infomuch as the *Corne* neuer commeth vp; And (many times) they are forced to resow *Sommer-Corne*, where they sowed *Winter-Corne*. Another ill *Accident* is *Bitter Frosts*, continued, without *Snow*; Especially in the Beginning of the *Winter*, after the *Seed* is new Sown. Another *Disease* is *Wormes*; which sometimes breed in the *Root*, and happen vpon Hot *Sunnes*, and *Showers*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Especially when Hot *Sunnes* breake often out of *Clouds*. Another *Disease* is *Weeds*; And they are such, as either Choake, and Ouershadow the *Corne*, and beare it downe; Or starue the *Corne*, and deceiue it of Nourishment. Another *Disease* is, *Ouer-Rancknesse* of the *Corne*; Which they vse to remedy, by *Mowing* it after it is come vp; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Haruest*. Another ill *Accident* is, if the *Seed* happen to haue touched *Oyle*, or any Thing, that is *Fat*; For those *Substances* haue an *Antipathy* with *Nourishment* of *Water*.

The *Remedies* of the *Diseases* of *Corne* haue beene obserued as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preseruatiue*: The *Mingling* of *Seed-Corne* with *Asbes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* sound: It hath not beene practised, but it is thought to be of vse, to make some *Miscellane* in *Corne*; As if you sow a few *Beanes* with *Wheat*, your *Wheat* will be the better. It hath beene obserued, that the *Sowing* of *Corne* with *Honsleeke*, doth good. Though *Graine*, that toucheth

toucheth Oyle, or Fat, receiueh hurt, yet the Steeping of it, in ithe Dregs of Oyle, when it beginneth to Putrifie, (which they call *Amurca*,) is thought to assure it against *Wormes*. It is reported also, that if *Corne* be *Mowed*, it will make the *Graine* Longer, but Emptier, and hauing More of the *Huske*.

671

It hath beene noted, that *Seed* of a yeare old, is the Best; And of two or three yeares is Worse; And that which is more Old, is quite Barren; Though (no doubt) some *Seeds* and *Graines* last better than others. The *Corne*, which in the *Vanning* lieth lowest, is the best; And the *Corne*, which broken or bitten retaineth a little *Yellownesse*, is better than that which is very *White*.

672

It hath beene obserued, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth*; Inso much as it hath bin knowne to go three Cubits deepe; And that it is the *Root* that continueth fit (longest) to be set againe, of any *Root* that groweth. It is a *Cold* and *Acide Herbe*, that (as it seemeth) loueth the *Earth*, and is not much drawne by the *Sunne*.

673

It hath beene obserued, that some *Herbs* like best, being watred with *Salt-Water*; As *Radish*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674

It is strange that is generally receiued, how some *Poysonous Beasts* affect *Odorate* and *Wholesome Herbs*; As that the *Snake* loueth *Fennell*; That the *Toad* will be much vnder *Sage*; That *Frogs* will be in *Cinque foile*. It may be, it is rather the *Shade*, or other Couerture, that they take liking in, than the Vertue of the *Herbe*.

675

It were a Matter of great Profit, (saue that I doubt it is too Coniecturall to venture vpon,) if one could discerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the Yeare: For as for those, that are like to be in *Plenty*, they may be bargained for, vpon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to be rich, when he fore-saw a great *Plenty* of *Olines*, made a *Monopoly* of them. And for *Scarcity*, Men may make Profit in keeping better the Old Store. Long Continuance of *Snow* is beleued to make a *Fruitfull Yeare* of *Corne*: An *Earely Winter*, or a very *Late Winter*, a *Barren Yeare* of *Corne*: An *Open* and *Serene Winter*, an ill Yeare of *Fruit*: These we haue partly touched before: But other *Prognosticks* of like Nature are diligently to be enquired.

676

There seeme to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Oline* hath the *Oyly Part*, only on the *Outside*; Whereas all other *Fruits* haue it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines* *Kernells*. The *Pomegranate* and *Pine-Apple* haue onely, amongst *Fruits*, *Graines* distinct in seuerall *Cells*. No *Herbs* haue *Curled Leanes*, but *Cabbage*, and *Cabbage-Lettuce*. None haue double *Leanes*, one belonging to the

the *Stalke*, another to the *Fruit* or *Seed*, but the *Artichoke*: No *Flower* hath that kinde of *Spread* that the *Woodbine* hath. This may be a large *Field of Contemplation*; For it sheweth that in the *Frame of Nature*, there is, in the *Producing* of some *Species*, a *Composition* of *Matter*, which happeneth oft, and may be much diuersified: In others, such as happeneth rarely, and admitteth little *Variety*: For so it is likewise in *Beasts*: *Dogs* haue a *Resemblance* with *Wolues*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Buffes*; *Hares* with *Coneyes*; &c. And so in *Birds*: *Kites* and *Kestrells* haue a *Resemblance* with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black-Birds* with *Thrushes*, and *Manisses*; *Crowes* with *Rauens*, *Dawes*, and *Chonghes*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird of Paradise*, and the *Peacocke* amongst *Birds*; And some few others; haue scarce any other *Species*, that haue *Affinity* with them.

We leaue the *Description* of *Plants*, and their *Vertues*, to *Herballs*, and other like *Bookes* of *Naturall History*: Wherein *Mens Diligence* hath beene great, euen to *Curiosity*: For our *Experiments* are onely such, as doe euer ascend a *Degree*, to the *Deriuing* of *Causes*, and *Extracting* of *Axiomes*, which, wee are not ignorant, but that some, both of the *Ancient*, and *Moderne Writers*, haue also laboured; But their *Causes*, and *Axiomes*, are so full of *Imagination*, and so infected with the old *Receiued Theories*, as they are meere *Inquinations* of *Experience*, and *Concoct* it not.

It hath beene obserued, by some of the *Ancients*, that *Skins*, (especially of *Rams*,) newly pulled off, and applied to the *Wounds* of *Stripes*, doe keepe them from *Swelling*, and *Exulcerating*; And likewise Heale them, and Close them vp; And that the *Whites* of *Eggs* do the same. The *Cause* is a *Temperate Conglutination*; For both *Bodies* are *Clammy*, and *Viscous*, and doe bridle the *Deflux* of *Humours* to the *Hurts*, without *Penning* them in too much.

You may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into *Peeces*, and put the *Peeces* into a *Glasse* couered with *Parchment*; And so let the *Glasse* stand six or seuen *Houres* in *Boiling Water*. It may be an *Experiment* of *Profit*, for *Making* of *Fat*, or *Grease*, for many vses; But then it must be of such *Flesh* as is not *Edible*; As *Horses*, *Dogs*, *Bears*, *Foxes*, *Badgers*, &c.

Experiment
Solitary tou-
ching Healing
of Wounds.

677

Experiment
Solitary, tou-
ching Fat diffu-
sed in Flesh.

678

It

Experiment
Solitary, tou-
ching Ripening
of Drink before
the Time.

679

Experiment
Solitary, tou-
ching Pilosity
and Plumage.

680

It is reported by one of the *Ancients*, that *New Wine*, put into *Vessells* well stopped, and the *Vessells* let downe into the *Sea*, will accelerate very much, the Making of them Ripe, and Potable. The same would be tried in *Wort*.

Beasts are more *Hairy* than *Men*; And *Savage Men* more than *Civill*; And the *Plumage* of *Birds* exceedeth the *Pilosity* of *Beasts*. The Cause of the Smoothnesse in *Men*, is not any Abundance of *Heat*, and *Moisture*, though that indeed causeth *Pilosity*; But there is requisite to *Pilosity*, not so much *Heat* and *Moisture*, as *Excrementitious Heat* and *Moisture*: (For whatsoeuer assimilath, goeth not into the *Haire*:) And *Excrementitious Moisture* aboundeth most in *Beasts*, and *Men* that are more *Savage*. Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* assimilate lesse, and exerne more than *Beasts*: For their *Excrements* are euer liquid, and their *Flesh* (generally) more dry: Besides, they haue not *Instruments* for *Urine*; And so all the *Excrementitious Moisture* goeth into the *Feathers*: And therefore it is no Maruell, though *Birds* bee commonly better Meat than *Beasts*, because their *Flesh* doth assimilate more finely, and secerneth more subtilly. Againe, the *Head* of *Man* hath *Haire* vpon the first *Birth*, which no other *Part* of the *Body* hath. The Cause may be Want of *Perspiration*: For Much of the Matter of *Haire*, in the other *Parts* of the *Body*, goeth forth by *Insensible Perspiration*; And besides, the *Skull* being of a more solide Substance, nourisheth and assimilath lesse, and excerneth more: And so likewise doth the *Chinne*; We see also that *Haire* commeth not vpon the *Palmes* of the *Hands*, nor *Soales* of the *Feet*; Which are *Parts* more *Perspirable*. And *Children* likewise are not *Hairy*, for that their *Skins* are more *Perspirable*.

Experiment
Solitary, tou-
ching the
Quicknesse of
Motion in
Birds.

681

Birds are of *Swifter Motion* than *Beasts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beasts*. The Cause is, for that the *Spirits* in *Birds*, are in greater Proportion, in comparison of the Bulke of their *Body*, than in *Beasts*: For as for the Reason that some giue, that they are partly Carried, whereas *Beasts* goe, that is Nothing; For by that Reason *Swimming* should be swifter, than *Running*: And that Kinde of *Carriage* also, is not without Labour of the *Wing*.

Experiment
Solitary, tou-
ching the diffe-
rent Clearenesse
of the Sea.

682

The *Sea* is *Cleaver*, when the *North-wind* bloweth, than when the *South-wind*. The Cause is, for that *Salt-Water* hath a little *Oyliness* in the *Surface* thereof; As appeareth in very Hot Daies: And againe, for that the *Southerne Wind* relaxeth the *Water* somewhat; As no *Water Boiling* is so *Cleare* as *Cold Water*.

Experiment
Solitary, tou-
ching the diffe-
rent Heat of
Fire and *Boiling*
Water.

683

Fire burneth *Wood*, making it first *Luminous*; Then *Blacke* and *Brittle*; And lastly, *Broken* and *Incinerate*: *Scalding Water* doth none of these. The Cause is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, and then *Emitted*; Whereof the *Refining*, or *Attenuation* causeth the *Light*; And

And the *Emission*, first the *Fragilitie*, and after the *Dissolution* into *Ashes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* so much; And besides Part of the *Water* entreth; Which doth increase the *Spirit*, and in a degree extinguiſh it: Therefore wee see that *Hot Water* will quench *Fire*. And againe wee see, that in *Bodies*, wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*, (into which the *Water* entreth not at all,) there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

The *Bottom* of a *Vessel* of *Boyling Water*, (as hath beene obserued,) is not very much *Heated*; So as Men may put their *Hand* vnder the *Vessel*, and remoue it. The *Cause* is, for that the *Moisture* of *Water*, as it quen- cheth *Coales*, where it entreth; So it doth allay *Heat*, where it toucheth: And therefore note well, that *Moisture*, although it doth not passe thro- row *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe;) yet it worketh manifest Eff. &ts; not by Entrance of the *Bo- dy*, but by Qualifying of the *Heat*, and *Cold*; As wee see in this *In- stance*: And wee see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*,) differeth not much from the *Water* of *Things Distilled* by *Fire*: Wee see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will: Nay wee see more, that *Butter*, or *Oyle*, which in themselves are *Inflammable*, yet by Vertue of their *Moisture*, will doe the like.

Experiment Solitary tou- ching the Quo- lification of Heat by Moisture.

684

It hath beene noted by the *Ancients*, that it is dangerous to Picke ones *Eare*, whilst he *Yawneth*. The *Cause* is, for that in *Yawning*, the *Inner Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

Experiment Solitary, tou- ching Yawning.

685

It hath beene obserued by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough*, is a *Lifting up* of the *Stomack*; which *Sneezing* doth somewhat depresse, and diuert the *Motion* another way. For first wee see, that the *Hiccough* commeth of *Fulnesse* of *Meat*, (especially in *Children*;) which causeth an Extension of the *Stomack*: Wee see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomack*: And this *Motion* is ceased, ei- ther by *Diuerſion*; Or by *Detention* of the *Spirits*: *Diuerſion*, as in *Snee- zing*; *Detention*, as wee see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a *Man* into an Earnest Studie doth the like; As is commonly vsed: And *Vinegar* put to the *Noſthrills*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibiteth the *Motion* of the *Spirits*.

Experiment Solitary, tou- ching the Hic- cough.

686

Z

Looking

Experiment
Solitary, tou-
ching Sneezing
687

Looking against the *Sunne*, doth induce *Sneezing*. The Cause is, not the *Heating* of the *Nosthrills*; For then the *Holding vp* of the *Nosthrills* against the *Sunne*, though one *Winke*, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Nosthrills*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Nosthrills* within, doth draw the *Moisture* to the *Nosthrills*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene obserued, that if one be about to *Sneeze*, the *Rubbing* of the *Eyes*, till they run with *Water*, will preuent it. Whereof the Cause is, for that the *Humour*, which was descending to the *Nosthrills*, is diuer-
ted to the *Eyes*.

Experiment
Solitary, tou-
ching the Ten-
dernesse of the
Teeth.
688

The *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The Cause is double: The One, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Flesh*; for that the *Flesh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth* are *Parts* without *Bloud*; Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore wee see, that the *Sinnewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in *Sharpe Colds* wax *Brittle*; And therefore, it hath beene seene, that all *Contusions* of *Bones*, in *Hard Weather*, are more difficult to Cure.

Experiment
Solitary, tou-
ching the
Tongue.
689

It hath beene noted, that the *Tongue* receiueth, more easily, *Tokens* of *Diseases*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blacknesse* of the *Tongue*. Again, *Pied Cattell* are spotted in their *Tongues*, &c. The Cause is, (no doubt,) the *Tendernesse* of the *Part*; which thereby receiueth more easily all *Alterations*, than any other *Parts* of the *Flesh*.

Experiment
Solitary, tou-
ching the
Taste.
690

When the *Mouth* is out of *Taste*, it maketh *Things* taste, sometimes *Salt*; Chiefly *Bitter*; And sometimes *Loathsome*; But neuer *Sweet*. The Cause is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathsome*; But *Sweet* neuer; For the rest are *Degrees* of *Corruption*.

Experiment
Solitary tou-
ching some
Prognosticks of
Pestilentiall
Seasons.
691

It was obserued in the *Great Plague* of the last Yeare, that there were seene, in diuers *Ditches*, and low *Grounds*, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the least; Whereas *Toads* (vsually) haue no *Tailes* at all. Which argueth a great Disposition to *Putrefaction* in the *Soile*, and *Aire*. It is reported likewise, that *Roots*, (such as *Carrets*, and *Parsnips*,) are more *Sweet*, and *Lushious*, in *Inferiours* Yeares, than in other Yeares.

Experiment
Solitary tou-
ching Speciall
Simples for
Medicines.
692

Wise *Physitians* should with all diligence inquire, what *Simples* Na-
ture yeeldeth, that haue extreme *Subtile Parts*, without any *Mordication*,
or

or *Acrimony*: For they Vndermine that which is *Hard*; They open that which is *Stopped*, and *Shut*; And they expell that which is *Offensive*, gently, without too much *Perturbation*. Of this Kinde are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this kinde is the *Dwarfe-Pine*; which is Proper for the *Iaundies*: Of this kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this kinde is *Piony*; which is Proper for *Stoppings* in the *Head*: Of this kinde is *Fumitory*; which is Proper for the *Spleene*: And a Number of Others. Generally, diuers *Creatures* bred of *Putrefaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Snails*, &c. And I conceiue, that the *Trochiscs* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some wayes condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts* of *Beasts* *Putrified*; (as *Castoreum*, and *Muske*, which haue extreme *Subtill Parts*,) are to be placed amongst them. We see also that *Putrefactions* of *Plants*, (as *Agaricke*, and *Iewes-Eare*,) are of greatest Vertue. The Cause is, for that *Putrefaction* is the Subtillest of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take downe the *Lines* of *Living Creatures*, (which some of the *Paracelsians* say (if they could be taken downe,) would make vs *Immortall*;) the Next is for *Subtily* of *Operation*, to take *Bodies Putrefied*; Such as may be safely taken.

It hath beene obserued by the *Ancients*, that Much Use of *Venus* doth *Dimme* the *Sight*; And yet *Eunuchs*, which are vnable to generate, are (neuerthelesse) also *Dimme Sighted*. The Cause of *Dimnesse* of *Sight*, in the Former, is the *Expence* of *Spirits*: In the Latter, the *Ouer-moisture* of the *Braine*: For the *Ouer-moisture* of the *Braine* doth thicken the *Spirits Visuall*, and obstructeth their Passages; As we see by the Decay, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurrerth as another Cause: we see also that *Blindnesse* cometh by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moisture*; As the Swelling of their *Thighes*, the Loosenesse of their *Belly*, the Smoothnesse of their *Skinne*, &c.

The *Pleasure* in the *Act* of *Venus* is the greatest of the *Pleasures* of the *Senses*: The Matching of it with *Itch* is vnproper; though that also be *Pleasing* to the touch. But the Causes are *Profound*. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many *Seuerall Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diuersities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of seuerall frame; And so are the *Parts* for *Generation*. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *Sixth Sense*; And if there were any other differing *Organs*, and *Qualified Perforations*, for the *Spirits* to passe; there would be more than the *Five Senses*: Neither doe we well know, whether some *Beasts*, and *Birds*, haue not *Senses* that we know not: And the very *Sent* of *Dogs* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper,

Experiments
in Consort
touching *Venus*.

693

694

deeper, than those of the other *Senses*; As we see in *Warming* vpon *Cold*; Or *Refrigeration* vpon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits* immediately, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *Wine*, and the like *Sweet Vapours*. For *Smells*, wee see their great and sudden Effect in fetching *Men* againe, when they swoone: For *Drinke*, it is certaine, that the *Pleasure* of *Drunkenesse*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* moue, and touch themselves: And the *Pleasure* of *Venus* is somewhat of the same Kinde.

695

It hath beene alwayes obserued, that *Men* are more inclined to *Venus* in the *Winter*, and *Women* in the *Summer*. The *Cause* is, for that the *Spirits*, in a *Body* more Hot and dry, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Women* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the *Use* of *Venus*, in *Moist* and well *Habituate Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The Reason is euident; For that it is a Principall *Euacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Euacuation*, but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments
in Consort
touching the
Insecta.

The *Nature* of *Viuiification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceiued, in *Small*, than in *Great*; and in vnperfect, than in perfect, and in *Parts*, than in *whole*: So the *Nature* of *Viuiification* is best enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Disclosing* the *Originall* of *Viuiification*. Secondly, in *Disclosing* the *Originall* of *Figuration*. Thirdly, in *Disclosing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lye more hidden. And Fourthly, in *Traducing*, by way of *Operation*, some *Observations* in the *Insecta*, to worke *Effects* vpon *Perfect Creatures*. Note that the word *Insecta*, agreeth not with the Matter, but we euer vse it for Breuities sake, intending by it *Creatures* bred of *Putrefaction*.

696

The *Insecta* are found to breed out of seuerall *Matters*: Some breed of *Mud*, or *Dung*; As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth *Putrifie*, as not able to *Preserue* it selfe: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefacti-*

ons

ons of *Nourishment*. Some breed in *Wood*, both Growing, and Cut down. *Quare* in what *Woods* most, and at what *Seasons*? We see that the *Worms* with many Feet, which round themselves into Balls, are bred chiefly vnder *Logs* of *Timber*, but not in the *Timber*; And they are said to be found also, (many times,) in *Gardens*, where no *Logs* are. But it seemeth their *Generation* requireth a *Couerture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therefore they are not *Venemous*, but (contrariwise) are held by the *Physicians* to clarify the *Bloud*. It is obserued also that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Haire* of *Living Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* close kept, and somewhat arefied by the *Haire*. The *Excrements* of *Living Creatures*, do not only breed *Insecta*, when they are *Excerned*, but also while they are in the *Body*; As in *Wormes*, whereto *Children* are most subiect, and are chiefly in the *Guts*. And it hath beene lately obserued by *Physicians*, that in many *Pestilent Diseases*, there are *Wormes* found in the vpper Parts of the *Body*, where *Excrements* are not, but onely *Humours Putrified*. *Fleas* breed Principally of *Straw* or *Mats*, where there hath beene a little *Moisture*; Or the *Chamber* and *Bed-straw* kept close, and not *Aired*. It is receiued that they are killed by *Strewing Worme-wood* in the *Rooms*. And it is truly obserued, that *Bitter Things* are apt, rather to kill, than engender *Putrefaction*; And they be *Things*, that are *Fat*, or *Sweet*, that are aptest to *Putrifie*. There is a *Worme*, that breedeth in *Meale*, of the shape of a large white *Magget*, which is giuen as a great *Dainty* to *Nightingales*. The *Moath* breedeth vpon *Cloth*, and other *Lanifices*; Especially if they be laid vp dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worme* called a *Wenill*, bred vnder *Ground*, and that feedeth vpon *Roots*; As *Parfnips*, *Carrets*, &c. Some breed in *Waters*, especially shaded, but they must be *Standing-waters*; As the *Water-Spider*, that hath six *Legs*. The *Fly* called the *Gad-fly*, breedeth of somewhat that *Swim* meth vpon the *Top* of the *Water*, and is most about *Ponds*. There is a *Worme* that breedeth of the *Dregs* of *Wine Decayed*; which afterwards, (as is obserued by some of the *Ancients*,) turneth into a *Gnat*. It hath bin obserued by the *Ancients*, that there is a *Worme* that breedeth in old *Snow*, and is of Colour *Reddish*, and dull of *Motion*, and dieth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hardly *Viuijie*. And the Reason of the *Dying* of the *Worme*, may be the sudden *Exhaling* of that little *Spirit*, as soone as it commeth out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benumbed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserued in *Cold*. It is affirmed both by *Ancient* and *Moderne Observation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites*, (which is *Vitrioll*,) is often cast in, to mend the working, there riseth suddenly a *Fly*, which sometimes moueth, as if it tooke hold on the walls of the *Furnace*; Sometimes is scene moving in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well

Violent

Violent Heat of Fire, as the *Gentle Heat of Living Creatures*, will Viuifie, if it haue Matter Proportionable. Now the great *Axiome of Viuification* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; *Matter Viscous or Tenacious*, to hold in the *Spirit*; And that *Matter* to be put forth, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soone as euer it cooleth neuer so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will Put forth and germinate, as we see in *Chymicall Trialls*. Briefly, most *Things Putrified* bring forth *Insecta* of feuerall Names; But wee will not take vpon vs now, to Enumerate them all.

697

The *Insecta* haue beene noted by the *Ancients*, to feed little: But this hath not beene diligently obserued; For *Grashoppers* eat vp the *Greene* of whole *Countries*; And *Silke-wormes* deuoure *Leaves* swiftly; And *Ants* make great Prouision. It is true, that *Creatures*, that Sleepe and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* haue Extreme Variety, but the *Similar Parts* little. It is true, that they haue, (some of them,) a *Diaphragme*, and an *Intestine*; And they haue all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *long Life*: Yet *Bees* haue beene knowne to liue seven yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to liue till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will liue and grow very long: And those that Enterchange from *Wormes* to *Flies* in the *Summer*, and from *Flies* to *Wormes* in the *Winter*, haue beene kept in *Boxes* foure yeares at the least. Yet there are certain *Flies*, that are called *Ephemera*, that liue but a day. The *Cause* is, the *Exility* of the *Spirit*; Or perhaps the *Absence* of the *Sunne*; For that if they were brought in, or kept close, they might liue longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*,) reuiue easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the *Easie Dilating* of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in *Peeces*; Which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698

The *Insecta* haue *Voluntary Motion*, and therefore *Imagination*; And whereas some of the *Ancients* haue said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently obserued; For *Ants* goe right forwards to their *Hills*; And *Bees* doe (admirably) know the way, from a *Flowry Heath*, two or three Miles off, to their *Hives*. It may be, *Gnats*, and *Flies*, haue their *Imagination* more mutable, and giddy, as *Small Birds* likewise haue. It is said by some of the *Ancients*, that they haue onely the *Sense* of *Feeling*; which is manifestly untrue: For if they goe forth-right to a *Place*, they must needs haue

Sight:

Sight: Besides they delight more in one *Flower*, or *Herbe*, than in another, and therefore haue *Taste*: And *Bees* are called with *Sound* vpon *Brasse*, and therefore they haue *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations concerning the Insecta, together with the Enumeration of them, wee referre to that Place, where wee meane to handle the Title of Animal's in generall.

A *Man* *Leapeth* better with *Weights*, in his *Hands*, than without. The *Cause* is, for that the *Weight*, (if it be proportionable,) strengthneth the *Sinewes*, by *Contracting* them. For otherwise, where no *Contraction* is needfull, *Weight* hindereth. As wee see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, vpon the one *Horse*, more than vpon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater *Force*: For the *Hands* goe backward before they take their *Raise*. *Quere*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* wee intend, doth not cause the *Spirits*, as it were, to breake forth with more *Force*: As *Breath* also drawne, and kept in, cometh forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater *Swing*, are first cast backward.

Experiment
Solitary touching
Leaping.

699

Of *Musicall Tones*, and *Vnequall Sounds*, wee haue spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skrieking Noise*; make a *Shiuering* or *Horror* in the *Body*, and set the *Teeth* on edge. The *Cause* is, for that the *Obiects* of the *Eare*, doe affect the *Spirits* (immediately) most with *Pleasure* and *Offence*. Wee see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There be *Sights*, that are *Horrible*, because they excite the *Memory* of *Things* that are *Odious*, or *Fearfull*; But the same *Things Painted* doe little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Obiect*. So it is *Sound* alone, that doth immediately, and incorporeally, affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharpe, or Flat, if they be Sweet, haue a *Roundnesse* and *Equality*; And if they be Harsh, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Diners Sounds Meeting*. It is true, that *Inequality*, not Stayed vpon, but Passing, is rather an *Encrease* of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucity* of a *Trumpet*; And in the *Nightingale-Pipe* of a *Regall*; And in a *Discord* straight falling vpon a *Concord*: But if you stay vpon it, it is *Offensue*; And therefore, there bee these three *Degrees* of *Pleasing*, and

Experiment
Solitary, touching the
Pleasures, and Displeasures
of the Senses, especially
of Hearing.

700

and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by diuers Names, as *Skrieking*, or *Grating*, such as wee now speake of. As for the *Setting* of the *Teeth* on *Edge*, we see plainly, what an Intercourse there is, betwene the *Teeth*, and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, betwene the *Teeth*, and *Striking* vpon the *String*.

NATV-



NATVRALL HISTORIE.

VIII. Century.



Here be *Mineralls*, and *Fossiles*, in great Variation; But of *Veines of Earth Medicinall*, but few; The Chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Arminius*. Whereof *Terra Lemnia* is the Chiefe. The Vertues of them are, for Curing of Wounds, Stanching of Bloud, Stopping of Fluxes and Rheumes, and Arresting the Spreading of Poleson, Infection, and Putrefaction: And they haue, of all other *Simples*, the Perfectest and Purest Qualitie of Drying, with little or no Mixture of any other Qualitie. Yet it is true, that the *Bolus Arminicus* is the most Cold of them; And that *Terra Lemnia* is the most Hot; For which Cause, the Island *Lemnos*, where it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

About the Bottome of the Straights are gathered great Quantities of *Sponges*, which are gathered from the sides of *Rocks*, being as it were a large, but rough, *Mosse*. It is the more to be noted; because that there be but few *Substances*, *Plant-like*, that grow deepe within the Sea; For they are gathered sometimes fiftene Fathome deepe; And when they are laid

Experiment
Solitary touching
Veines
of Medicinall
Earth.

701

Experiment
Solitary, touching
the
Growth of
Sponges.

702

on Shoare, they seeme to be of great Bulke; But crushed together, will be transported in a very small Roome.

Experiment
Solitary tou-
ching Sea-Fish
put in Fresh
waters.

703

It seemeth, that *Fish*, that are vsed to the *Salt-Water*, doe neuerthelesse delight more in *Fresh*. Wee see, that *Salmons*, and *Smelts*, loue to get into *Riuers*, though it be against the *Streame*. At the *Hauen* of *Constantinople*, you shall haue great *Quantities* of *Fish* that come from the *Euxine-Sea*; that when they come into the *Fresh Water*, doe inebriate and turne vp their *Bellies*; So as you may take them with your Hand. I doubt, there hath not beene sufficient *Experiment* made of Putting *Sea-Fish* into *Fresh Water*, *Ponds*, and *Pooles*. It is a Thing of great Vse, and Pleasure: For so you may haue them new at some good distance from the *Sea*: And besides, it may be, the *Fish* will eat the pleasanter, and may fall to breed: And it is said that *Colchester Oysters*, which are put into *Pits*, where the *Sea* goeth and commeth, (but yet so, that there is a *Fresh Water* coming also to them, when the *Sea* voideth,) become by that meanes *Fatter*, and more *Growne*.

Experiment
Solitary, tou-
ching *Attraction*
by *Similitude*
of *Substance*.

704

The *Turkish-Bow* giueth a very *Forcible Shoot*; Insomuch as it hath beene knowne, that the *Arrow* hath pierced a *Steele Target*, or a *Peece* of *Brasse* of two Inches thicke: But that which is more strange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a *Peece* of *Wood*, of eight Inches thicke. And it is certaine, that wee had in vse at one time, for *Sea-Fight*, short *Arrowes*, which they called *Sprights*, without any other Heads, rawe *Wood* inarped; which were discharged out of *Muskets*, and would pierce thorow the *Sides* of *Ships*, where a *Bullet* would not pierce. But this dependeth vpon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude* of *Substance* will cause *Attraction*, where the *Body* is wholly freed from the *Motion* of *Gravitie*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the helpe of the *Load-Stone*. But this same *Motion* of *Weight* or *Gravitie*, (which is a meere *Motion* of the *Matter*, and hath no *Affinitie* with the *Forme*, or *Kinde*,) doth kill the other *Motion*, except it selfe be killed by a violent *Motion*; As in these *Instances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Substance*, beginneth to shew it selfe. But wee shall handle this *Point* of *Nature* fully in due *Place*.

Experiment
Solitary, tou-
ching certaine
Drinckes in *Tur-*
ky.

705

They haue in *Turkey*, and the *East*, certaine *Confections*, which they call *Seruets*, which are like to *Candied Conserues*; And are made of *Sugar* and *Limons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some other *Flowers*; And some Mixture of *Amber* for the more delicate *Persons*; And those they dissolue in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by their *Law*. But I doe much maruell, that no *Englishman*, or *Dutchman*, or *German*, doth set vp *Brewing* in *Constantinople*; Considering they haue such *Quantitie* of *Barley*. For as for the

the generall Sort of *Men*, Frugalitie may be the Cause of *Drinking Water*; For that it is no small Sauing, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Cost. And yet I wonder the lesse at it, because I see *France*, *Italie*, or *Spaine*, haue not taken into vse, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that should begin it in *Turkey*.

In *Bathing in Hot Water*, *Sweat* (neuerthelesse) commeth not in the *Parts* vnder the *Water*. The Cause is; First, for that *Sweat* is a Kinde of *Colliquation*. And that Kinde of *Colliquation* is not made, either by an *Ouer-Drie Heat*, or an *Ouer-Moist Heat*. For *Ouer-Moisture* doth somewhat extinguish the *Heat*; As wee see that euen *Hot Water* quencheth *Fire*: And *Ouer-Drie Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* couered before the *Sunne*, or *Fire*, than if they stood Naked; And *Earthen Bottles*, filled with *Hot Water*, doe prouoke, in Bed, a *Sweat* more daintily, than *Bricke-bats Hot*. Secondly, *Hot Water* doth cause *Euaporation* from the *Skin*; So as it spendeth the Matter, in those *Parts* vnder the *Water*, before it issueth in *Sweat*. Againe, *Sweat* commeth more plentifully, if the *Heat* be increased by *Degrees*, than if it be greatest at first, or equall. The Cause is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physitians* may doe well, when they prouoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorificke Herbs* in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the lesse *Heated* first, and after halfe an *Houre* the more *Heated*.

Sweat is *Salt* in Taste; The Cause is, for that, that *Part* of the *Nonrishment*, which is *Fresh* and *Sweet*, turneth into *Bloud*, and *Flesh*; And the *Sweat* is only that *Part* which is *Separate*, and *Excerned*. *Bloud* also *Raw* hath some *Saltnesse*, more than *Flesh*; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Bloud*.

Sweat commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The Reason is, because those *Parts* are more replenished with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Dry*; As the *Forehead*, and *Breast*.

Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleepe* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The Cause is, for that in *Sleepe*, the *Heat* and *Spirits* doe naturally moue inwards, and there rest. But when they are collected once within, the *Heat* becommeth more *Violent*, and *Irritate*; And thereby expelleth *Sweat*.

Cold Sweats are (many times) *Mortall*, and neere *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The Cause is, for that *Cold Sweats* come by a *Relaxation* or *Forsaking* of the *Spirits*.

Experiments
in Consort,
touching *Sweat*

706

707

708

709

710

Spirits, wherby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, seuereth, and issueth out.

711

In those *Diseases*, which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lighteneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the Latter Sort is partly *Criticall*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moueth to an *Expulsion* indifferent ouer all the *Body*.

Experiment
Solitary, touch-
ing the *Glo-*
worme.

712

The *Nature* of the *Glo-worme* is hitherto not well obserued. Thus much we see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Wherby it may be conceiued, that the *Spirit* of them is very fine, and not to be refined, but by *Summer Heats*; And againe, that by reason of the Finenesse, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Fly* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme*. But that *Fly* is chiefly vpon *Fens*, and *Marri-shes*. But yet the two former *Observations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greene* of the *Fens*, giue as good *Shade*, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so farre as to be *Winged*.

Experiments
in Consort,
touching the
Impressions,
which the *Pas-*
sions of the
Minde make
vpon the *Body*.

713

The *Passions* of the *Minde*, worke vpon the *Body* the *Impressions* following. *Feare* causeth *Palenesse*; *Trembling*; The *Standing* of the *Haire vpright*; *Starting*; and *Skritching*. The *Palenesse* is caused, for that the *Blond* runneth inward, to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing vpright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth a-sloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that kinde, it is a *Motion* of *Shrinking*;) And likewise an *Inquisition*, in the beginning, what the *Matter* should be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would listen suddenly to any *Thing*, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skritching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions*, though they be vnprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* vpon *Paine*.

714

Griefe and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Rearing*; *Teares*; *Distorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the *Drawing* in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty.

Sobbing

Sobbing is the same Thing stronger. *Groaning*, and *Screaming*, and *Roaring*, are caused by an *Appetite* of *Expulsion*, as hath beene said: For when the *Spirits* cannot expell the Thing that hurteth, in their Strife to do it, by *Motion* of *Consent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and giue ouer to resist; For if one doe constantly resist *Paine*, he will not groane. *Teares* are caused by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by consequence astringeth the *Moisture* of the *Braine*, and thereby sendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*; For *Wringing* is a *Gesture* of *Expression* of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first to beare and resist, and then to expell Which maketh the *Parts* knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Sweating* is also a *Compound Motion* by the *Labour* of the *Spirits*, first to resist, and then to expell.

Ioy causeth a *Chearefulness*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Teares*. All these are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Linely*, and *Stirring*. We know it hath beene seene, that *Excessive Sudden Ioy*, hath caused *Present Death*, while the *Spirits* did spread so much, as they could not retire againe. As for *Teares*, they are the *Effects* of *Compression* of the *Moisture* of the *Braine*, vpon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Braine*, by *Consent*, as hath beene said in *Griefe*. But then in *Ioy*, it worketh it diuersly; viz. by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupy more *Roome*.

Anger causeth *Paleness* in some, and the *Going* and *Comming* of the *Colour* in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Paleness*, and *Going*, and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselves call in more *Spirits* from the *Outward Parts*. And if the *Paleness* be alone, without *Sending forth* the *Colour* againe, it is commonly ioyned with some *Feare*; But in many there is no *Paleness* at all, but contrariwise *Redness* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Revenge*. *Trembling* in *Anger* is likewise by a *Calling in* of the *Spirits*; And is commonly, when *Anger* is ioyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boiling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same Cause, being an *Ebullition*. *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Revenge*.

Light Displeasure or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same Causes that *Trembling*, and *Horror* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a *Slow* and *Definite*

715

716

717

Definite Trembling; And is a Gesture of Slight Refusall: And we see also, that a Dislike causeth (often) that Gesture of the Hand, which wee vse, when we refuse a Thing, or warne it away. The Frowning, and Knitting of the Browes, is a Gathering, or Serring of the Spirits, to resist in some Measure. And we see also, this Knitting of the Browes will follow vpon earnest Studying, or Cogitation of any Thing, though it bee without Dislike.

718

Shame causeth Blushing; And Casting downe of the Eyes. Blushing is the Resort of Blood to the Face; Which in the Passion of Shame is the Part that laboureth most. And although the Blushing will be seene in the whole Breast, if it be Naked, yet that is but in Passage to the Face. As for the Casting downe of the Eyes, it proceedeth of the Reuerence a Man beareth to other Men; Whereby, when he is ashamed, he cannot endure to looke firmly vpon Others: And we see that Blushing, and the Casting downe of the Eyes both, are more when we come before Many; *Ore Pompeij quid mollius? Nunquam non coram pluribus erubuit*: And likewise when we come before Great, or Reuerend Persons.

719

Pity causeth sometimes Teares; And a Flexion or Cast of the Eye aside. Teares come from the same Cause that they doe in Griefe: for Pity is but Griefe in Anothers Behalfe. The Cast of the Eye is a Gesture of Aversion, or Loathnesse to behold the Object of Pity.

720

Wonder causeth Astonishment, or an Immoveable Posture of the Body; Casting vp of the Eyes to Heauen; And Lifting vp of the Hands. For Astonishment, it is caused by the Fixing of the Minde vpon one Object of Cogitation, whereby it doth not spaiate and transurre, as it vseth: For in Wonder the Spirits fly not, as in Feare; But onely settle, and are made lesse apt to moue. As for the Casting vp of the Eyes, and Lifting vp of the Hands, it is a Kinde of Appeale to the Deity; Which is the Aushour, by Power, and Providence, of Strange Wonders.

721

Laughing causeth a Dilatation of the Mouth, and Lips; A Continued Expulsion of the Breath, with the loud Noise, which maketh the Interiection of Laughing; Shaking of the Breast, and Sides; Running of the Eyes with Water, if it be Violent, and Continued. Wherein first it is to be vnderstood, that Laughing is scarce (properly) a Passion, but hath his Source from the Intellect; For in Laughing there euer precedeth a Conceit of somewhat Ridiculous. And therefore it is Proper to Man. Secondly, that the Cause of Laughing is but a Light Touch of the Spirits, and not so deepe an Impression as in other Passions. And therefore, (that which hath no Affinity with the Passions of the Minde,) it is moued, and that in great vehemency, onely by Tickling some Parts of the Body: And we see that Men euen in a Griued State of Minde, yet cannot sometimes forbear Laughing. Thirdly, it is euer ioyned with some Degree of Delight: And therefore Exhilaration hath some Affinity with Ioy, though it be a much Lighter Motion: *Res seueræ est verum Gaudium*. Fourthly, that the Object of it is Deformity, Absurdity, Shrew'd Turnes, and the like. Now to speake of the Causes of the Effects before mentioned, whereunto these

Generall

Generall Notes giue some *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulsion* of the *Breath* and *Voice*, and *Shaking* of the *Breast* and *Sides*, they proceed (all) from the *Dilatation* of the *Spirits*; Especially being *Sudden*. So likewise, the *Running* of the *Eyes* with *Water*, (as hath beene formerly touched, where we spake of the *Tear*es of *Joy* and *Griefe*,) is an *Effect* of *Dilatation* of the *Spirits*. And for *Suddenesse*, it is a great *Part* of the *Matter*: For we see, that any *Shrew'd Turne* that lighteth vpon *Another*; Or any *Deformity*, &c. moueth *Laughter* in the *Instant*; Which after a little time it doth not. So we cannot *Laugh* at any *Thing* after it is *Stale*, but whilest it is *New*: And euen in *Tickling*, if you *Tickle* the *Sides*, and giue warning; Or giue a *Hard* or *Continued Touch*, it doth not moue *Laughter* so much.

Lust causeth a *Flagrancy* in the *Eyes*; and *Priapisme*. The *Cause* of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the *Things* desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (For that great *Vse* may be made of the *Observation*,) that (euermore) the *Spirits*, in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath been mentioned, they resort to the *Eyes*, and *Venerous Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Dislikes* to the *Head*.

It hath beene obserued by the *Ancients*, and is yet beleeued, that the *Sperme* of *Drunken Men* is *Vofruitfull*. The *Cause* is, for that it is *Ouer-moistened*, and wanteth *Spissitude*. And we haue a merry Saying, that they that goe *Drunke* to *Bed*, get *Daughters*.

Drunken Men are taken with a plaine *Defect*, or *Destitution* in *Voluntary Motion*. They *Reele*; They *tremble*; They cannot stand, nor speake strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate *Part* of the *Place*, where they are; And so make them *Weake* to moue. And therefore *Drunken Men* are apt to fall asleepe: And *Opiates*, and *Stupefactiues*, (as *Poppy*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkenesse*, by the *Grossnesse* of their *Vapour*; As *Wine* doth by the *Quantity* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey vpon it, as well as they: And so they make the *Spirits* lesse *Supple*, and *Apt* to moue.

Drunken Men imagine euery *Thing* turneth round; They imagine also that *Things* Come vpon them; They See not well *Things* a farre off; Those *Things* that they See neare hand, they See out of their *Place*; And (sometimes) they see *Things* double. The *Cause* of the *Imagination* that *Things* turne Round, is, for that the *Spirits* themselues turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* vpon *Compression*, turneth, as we see in *Water*:) And it is all one to the *Sight*, whether the *Visuall Spirits* moue, or the *Object* moueth, or the *Medium* moueth. And we see that long *Turning Round* breedeth the same *Imagination*.

722

Experiments
in Confort
touching Drunkenesse.

723

724

725

The Cause of the Imagination that *Things come vpon them*, is, for that the *Spirits Visuall* themselves draw backe; which maketh the *Object* seeme to come on; And besides, when they see *Things* turne Round, and Moue, *Feare* maketh them thinke they come vpon them. The Cause that they cannot see *Things a farre off*, is the *Weaknesse* of the *Spirits*; for in euery *Megrin*, or *Vertigo*, there is an *Obtenebration* ioyned with a Semblance of *Turning round*; Which we see also in the lighter Sort of *Swoonings*. The Cause of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Visuall*; For the *Vapour* is as an *Vnequall Medium*; And it is, as the Sight of *Things*, out of place, in *Water*. The Cause of *Seeing Things double*, is, the *Swift and Vnquiet Motion* of the *Spirits*, (being Oppressed,) to and fro; For, (as was laid before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Object*, make the same *Appearances*; And for the *Swift Motion* of the *Object*, we see, that if you fillip a *Lute-String*, it sheweth double, or Treble.

726

Men are sooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebriateth lesse, than *Wine Pure*. The Cause of the Former is, for that the *Wine* descendeth not so fast to the *Bottom* of the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebriateth sooner. And, for the same Reason, *Sops* in *Wine*, (Quantity for Quantity,) inebriate more, than *Wine* of it selfe. The Cause of the Latter is, for that the *Sugar* doth inspissate the *Spirits* of the *Wine*, and maketh them not so easie to resolue into *Vapour*. Nay further, it is thought, to be some Remedy against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken vpon much *Drinking*.

Experiment
Solitary touching the Helpe
or HURT of
Wine, though
Moderately used.

727

The Use of *Wine*, in *Dry*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Full Bodies*, it is good. The Cause is, for that the *Spirits* of the *Wine* doe prey vpon the *Dew*, or *Radical Moisture*, (as they terme it,) of the *Body*, and so deceiue the *Animall Spirits*. But where there is *Moisture* Enough, or *Superfluous*, there *Wine* helpeth to digest, and desiccate the *Moisture*.

Experiment
Solitary, touching
Catterpillers.

728

The *Catterpillar* is one of the most Generall of *Wormes*, and breedeth of *Dew*, and *Leaves*: For we see infinite Number of *Catterpillers*, which breed vpon *Trees*, and *Hedges*; By which the *Leaves* of the *Trees*, or *Hedges*, are in great Part consumed; As well by their Breeding out of the *Leafe*, as by their Feeding vpon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East Winds* haue much blowne: The Cause whereof is, the *Driness* of that *Wind*. For to all *Viuification* vpon *Putrefaction*, it is requisite the *Matter* be not too *Moist*: And therefore we see, they haue *Copwebs* about them, which is a signe of a *Slimy Driness*: As we see vpon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all ouer.

We

We see also the *Greene Catterpillar* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Catterpillers*, both the greatest, and the most, breed vpon *Cabbages*, which haue a *Fat Leafe*, and apt to *Putrifie*. The *Catterpillar* towards the *End of Summer* waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps some other *Fly*. There is a *Catterpillar*, that hath a *Furze*, or *Dawne* vpon him, and seemeth to haue *Affinity* with the *Silke-worme*.

The *Flyes Cantharides* are bred of a *Worme*, or *Catterpillar*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosiue*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersiue*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no maruell though *Cantharides* haue such a *Corrosiue*, and *Canterizing Quality*; For there is not any other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be, that the delicate-coloured *Dragon-Flies*, may haue likewise some *Corrosiue Quality*.

Experiment
Solitary, touching the *Flyes Cantharides*.

729

Lassitude is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warmed water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* giue a *Relaxation*, or *Emolliation*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry sofmeth better. It is found also, that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The *Reason* whereof is, partly, because by *Chearing* or *Comforting* of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischargeth *Wearinesse*; as *Sleepe* likewise doth.

Experiments
in Consort, touching *Lassitude*.

730

In *Going vp a Hill*, the *Knees* will be most *Wearie*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *List* of the *Feet*, when a Man *Goeth vp the Hill*, the *Weight* of the *Body* beareth most vpon the *Knees*; And in *Going downe the Hill*, vpon the *Thighes*.

731

The *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make euery *Casting* of the *Skin* a *New Birth*: And besides, the *Secundine* is but a generall *Couer*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grashopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crawfish*, the *Hodman-dod* or *Dedman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* neuer: So as it is like, they scale off, and crumble away by degrees. And they are knowne, by the *Extreme Tendernesse* and *Softnesse*

Experiment
Solitary touching the *Casting* of the *Skin*, and *Shell*, in some *Creatures*.

732

of the *New Shell*; And somewhat by the *Fresbnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantity* of *Matter* in those *Creatures*, that is fit to make *Skin*, or *Shell*; And againe, the *Loosenesse* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds*, that haue much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments
in Confort
touching the
Postures of the
Body.

733

Lying, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legges gathered vp*, which is in the Posture of the Body, is the more Whole some. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse *Penfile*: And we see, that in *Weake Stomachs*, the *Laying vp* of the *Legs* high, and the *Knees* almost to the *Mouth*, helpeth, and comforteth. We see also that *Gally-Slaues*, notwithstanding their *Misery* otherwise, are commonly *Fat* and *Fleshy*; And the *Reason* is, because the *Stomach* is supported somewhat in *Sitting*; And is *Penfile* in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbes* moue more than the *Stomach*, and *Belly*; As in *Rowing*, and in *Sawing* being *Set*.

734

Megrims and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the *Sudden Motion*, fly more vp into the *Head*.

735

Leaning long vpon any *Part* maketh it *Numme*, and, as wee call it, *Asleepe*. The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to haue free *Accesse*; And therefore, when wee come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment
Solitary, touch-
ing *Pestilentiall*
Yeares.

736

It hath beene noted, that those *Yeares* are *Pestilentiall*, and *Vnwhole-some*, when there are great *Numbers* of *Frogs*, *Flies*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you finde *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment
Solitary, touch-
ing the *Prognosticks* of *Hard*
Winters.

737

It is an *Observation* amongst *Country-People*, that *Yeares* of *Store* of *Hawes* and *Heps*, doe commonly portend *Cold Winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth euen to the *Falling of a Sparrow*; And much more is like to reach to the *Presernation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leaue great *Quantity* of *Cold Vapours*.

pours, not dissipate ; Which causeth the *Cold* of the *Winter* following.

They haue in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as *Blacke* as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into *Powder*, in *Water*, as *Hot* as they can drinke it : And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tauernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Disgestion*. Certainly this *Berry Coffa* ; The *Root*, and *Leafe Betel* ; The *Leafe Tobacco* ; And the *Teare* of *Poppy*, (*Opium*;) of which the *Turks* are great *Takers*, (supposing it expelleth all *Feare*;) doe all *Condense* the *Spirits*, and make them *Strong*, and *Aleger*. But it seemeth they are taken after seuerall manners ; For *Coffa* and *Opium* are taken downe ; *Tobacco* but in *Smoake* ; And *Betel* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quere* of *Henbane-Seed* ; Of *Mandrake* ; Of *Saffron*, *Root*, and *Flower* ; Of *Folium Indum* ; Of *Amber-grice* ; Of the *Affyrian Amomum*, if it may be had ; And of the *Scarlet Powder*, which they call *Kermex* ; And (generally) of all such Things, as doe inebriate, and prouoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible euer than *Leaves*.

Experiment
Solitary touching
Medicines that Con-
dense, and Re-
leene the Spirits.

738

The *Turkes* haue a *Blacke Powder*, made of a *Minerall* called *Alchole* ; Which with a fine long *Pencill* they lay vnder their *Eye-lids*, Which doth colour them *Blacke* ; Whereby the *White* of the *Eye* is set off more *white*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* vsed to paint their *Eyes*. The *Turkes* vse with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* *Blacke* : And diuers with vs, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* blacke, by *Combing* it, (as they say,) with a *Lead*en *Combe*, or the like. As for the *Chineses*, who are of an ill *Complexion*, (being *Oliuaster*;) they paint their *Cheekes* *Scarlet* ; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe *Naked*, doe not onely paint Themselves, but they pounce and raze their *Skinne*, that the *Painting* may not be taken forth ; And make it into *Works*. So doe the *West Indians* ; And so did the *Ancient Picts*, and *Brittons* ; So that it seemeth, *Men* would haue the *Colours* of *Birds Feathers*, if they could tell how ; Or at least, they will haue *Gay Skins*, in stead of *Gay Cloathes*.

Experiment
Solitary, touch-
ing Paintings
of the Body.

739

It is strange, that the *Vse* of *Bathing*, as a *Part* of *Diet*, is left. With the *Romans*, and *Grecians*, it was as vsuall, as *Eating*, or *Sleeping* : And so is it amongst the *Turkes* at this day: Whereas with vs it remaineth but as a *Part* of *Physicke*. I am of Opinion, that the *Vse* of it, as it was with the *Romans*, was hurtfull to *Health* ; For that it made the *Body* *Soft*, and easie to *Waste*. For the *Turkes* it is more proper, because that their *Drin-*

Experiment
Solitary, touch-
ing the Vse
of Bathing and
Annointing.

740

king

king Water, and *Feeding* vpon *Rize*, and other Food of small Nourishment, maketh their *Bodies* so Solide, and Hard, as you need not feare that *Bathing* should make them *Froathie*. Besides, the *Turkes* are great *Sitters*, and seldome walke; Whereby they Sweat lesse, and need *Bathing* more. But yet certaine it is, that *Bathing*, and especially *Annointing*, may be so vsed, as it may be a great Helpe to *Health*, and *Prolongation of Life*. But hereof we shall speake in due Place, when we come to handle *Experiments Medicinall*.

Experiment
Solitary, touching
Chamoletting of Paper.

741

The *Turkes* haue a Pretty Art of *Chamoletting of Paper*, which is not with vs in vse. They take diuers *Oyled Colours*, and put them seuerally (in drops) vpon *Water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some *Thicknesse*;) with it; And the *Paper* will be *Waued*, and *Veined*, like *Chamolets*, or *Marble*.

Experiment
Solitary, touching
Cuttle-Inke.

742

It is somewhat strange, that the *Bloud* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and only the *Bloud* of the *Cuttle* should be as *Blacke as Inke*. A Man would thinke, that the *Cause* should be the *High Concoction* of that *Bloud*; For wee see in ordinary *Puddings*, that the *Boyling* turneth the *Blond* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment
Solitary touching
Encrease of weight in Earth.

743

It is reported of Credit, that if you take *Earth*, from Land adioyning to the *Riuer of Nile*; And preserve it in that manner, that it neither come to be *Wet*, nor *Wasted*; And Weigh it daily, it will not alter *Weight* vntill the seuenteenth of *June*, which is the Day when the *Riuer* beginneth to rise; And then it will grow more and more *Ponderous*, till the *Riuer* commeth to his Heighth. Which if it be true, it cannot be caused, but by the *Aire*, which then beginneth to *Condense*; And so turneth within that Small *Mould* into a degree of *Moisture*; Which produceth *Weight*. So it hath beene obserued, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loseth *Weight*; And after being laid in the open *Aire*, recouereth *Weight* againe. And it should seeme, that as soone as euer the *Riuer* beginneth to increase, the whole *Body* of the *Aire* thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that vpon that very Day, when the *Riuer* first riseth, great *Plagues*, in *Cairo*, vse suddenly to breake vp.

Experiments
in Consort, touching
Sleepe.

744

Those that are very *Cold*, and especially in their *Feet*, cannot get to *Sleepe*. The *Cause* may be, for that in *Sleepe* is required a *Free Respiration*, which *Cold* doth shut in, and hinder: For wee see, that in great *Colds*, one can scarce draw his *Breath*. Another *Cause* may be, for that *Cold* calleth the *Spirits* to succour; And therefore they cannot so well close, and goe together in the *Head*; Which is euer requisite to *Sleepe*. And for the same *Cause*, *Paine*, and *Noise* hinder *Sleepe*; And *Darknesse* (contrariwise) furthereth *Sleepe*.

Some

Some *Noises* (whereof wee spake in the 112. *Experiments*) helpe *Sleepe*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The *Cause* is, for that they moue in the *Spirits* a gentle *Attention*; And whatsoever moueth *Attention*, without too much *Labour*, stilleth the *Naturall* and *discursiue Motion* of the *Spirits*.

Sleepe nourisheth, or at least preserveth *Bodies*, a long time, without other *Nourishment*. *Beasts* that sleepe in *Winter*, (as it is noted of *Wilde Beares*,) during their *Sleep* wax very *Fat*, though they *Eat* nothing. *Bats* haue beene found in *Ouens*, and other *Hollow Close Places*, Matted one vpon another; And therefore it is likely that they *Sleepe* in the *Winter* time, and eat *Nothing*. *Quare*, whether *Bees* doe not *Sleepe* all *Winter*, and spare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleepe*, but lye as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, reuiue againe. A *Dormouse*, both *Winter* and *Summer*, will *Sleepe* some dayes together, and eat *Nothing*.

To restore *Teeth* in *Age*, were *Magnale Nature*. It may be thought of. But howsoever the *Nature* of the *Teeth* deserueth to be enquired of, as well as the other *Parts* of *Liuing Creatures Bodies*.

Experiments
in Consort,
touching *Teeth*
and *Hard Sub-*
stances in the
Bodies of *Liuing*
Creatures.

There be *Five Parts* in the *Bodies* of *Liuing-Creatures*, that are of *Hard Substance*; The *Skull*; The *Teeth*; The *Bones*; The *Hornes*; and the *Nails*. The greatest *Quantity* of *Hard Substance* Continued, is towards the *Head*. For there is the *Skull* of one *Entire Bone*; There are the *Teeth*; There are the *Maxillary Bones*; There is the *Hard Bone*, that is the *Instrument* of *Hearing*; And thence issue the *Hornes*; So that the *Building* of *Liuing Creatures Bodies*, is like the *Building* of a *Timber-House*, where the *Walls*, and other *Parts* haue *Columnes*, and *Beames*; But the *Roofe* is, in the better *Sort* of *Houses*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they haue Three other *Hard Substances* proper to them; The *Bill*, which is of like *Matter* with the *Teeth*; For no *Birds* haue *Teeth*: The *Shell* of the *Egge*: And their *Quills*: For as for their *Spurre*, it is but a *Nail*. But no *Liuing-Creatures*, that haue *Shells* very hard; (As *Oysters*, *Cockles*, *Mussels*, *Scallops*, *Crabs*, *Lobsters*, *Cra-fish*, *Shrimps*, and especially the *Tortoise*,) haue *Bones* within them, but onely little *Gristles*.

Bones, after full *Growth*, continue at a *Stay*: And so doth the *Skull*: *Hornes*, in some *Creatures*, are cast, and renewed: *Teeth* stand at a *Stay* except their *Wearing*: As for *Nails*, they grow continually: And *Bills* and *Beakes* will ouer-grow, and sometimes be cast; as in *Eagles*, and *Parrots*.

Most of the *Hard Substances* fly to the *Extremes* of the *Body*; As *Skull*, *Hornes*, *Teeth*, *Nails*, and *Beakes*: Onely the *Bones* are more *Inward*, and clad with *Flesh*. As for the *Entrailes*, they are all without *Bones*; Saue that a *Bone* is (sometimes) found in the *Heart* of a *Stag*; And it may be in some other *Creature*.
The

750

The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Back-Bone* hath one Kinde of *Marrow*, which hath an Affinity with the *Braine*; And other *Bones* of the *Body* haue another. The *Jaw-Bones* haue no *Marrow* Seuered, but a little *Pulpe* of *Marrow* diffused. *Teeth* likewise are thought to haue a kind of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more than *Bloud*. *Horne* is alike throughout; And so is the *Naile*.

751

None other of the *Hard Substances* haue *Sense*, but the *Teeth*: And the *Teeth* haue *Sense*, not onely of *Paine*, but of *Cold*.

But we will leaue the Enquiries of other *Hard Substances*, vnto their *seuerall Places*; And now enquire onely of the *Teeth*.

752

The *Teeth* are, in *Men*, of three Kindes: *Sharpe*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed-Teeth*, or *Canine*, which are betweene both. But there haue beene some *Men*, that haue had their *Teeth* *undivided*, as of one whole *Bone*, with some little Marke in the Place of the Diuision; As *Pyrrhus* had. Some *Creatures* haue *Ouer-long*, or *Ouer-growing Teeth*, which wee call *Fangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs* though lesse. Some *Living Creatures* haue *Teeth* against *Teeth*; As *Men*, and *Horses*; And some haue *Teeth*, especially their *Master-Teeth*, indented one within Another, like *Sawes*; As *Lions*; And so againe haue *Dogs*. Some *Fishes* haue diuers *Rowes* of *Teeth* in the *Roofes* of their *Mouthes*; As *Pikes*, *Salmons*, *Trouts*, &c. And many more in *Salt-Waters*. *Snakes*, and other *Serpents*, haue *Venomous Teeth*; which are sometimes mistaken for their *Sting*.

753

No *Beast* that hath *Hornes*, hath *Vpper Teeth*; And no *Beast*, that hath *Teeth* aboue, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet è *conuerso*; For *Doe's*, that haue no *Hornes*, haue no *Vpper Teeth*.

754

Horses haue, at three yeares old, a *Tooth* put forth, which they call the *Colts Tooth*; And at foure yeares old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; And that weareth shorter and shorter, euery yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; That the *Marke* is out of the *Horses Mouth*.

755

The *Teeth* of *Men* breed first, when the *Childe* is about a yeare and halfe old: And then they cast them, and new come about seuen yeares old. But diuers haue *Backward-Teeth* come forth at *Twenty*, yea some at *Thirty*, and *Forty*. *Quere* of the manner of the *Comming* of them forth. They tell a Tale of the old *Countesse* of *Desmond*, who liued till she was seuen-score yeares old, that she did *Dentire*, twice, or thrice; Casting her old *Teeth*, and others *Comming* in their Place.

756

Teeth are much hurt by *Sweet-Meats*; And by *Painting* with *Mercury*; And by *Things Ouer-hot*; And by *Things Ouer-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

Concerning

Concerning *Teeth*, these Things are to be Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Staying* and *Easing* of the *Tooth-ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* haue beene stricken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The *Instances* that giue any likelihood of *Restoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are *Commateriall* with *Teeth*. *Quere* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to haue beene prouoked by *Art*; Therefore let *Triall* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they may be procured to come *Larger* than vsuall; As to make an *Oxe*, or a *Deere*, haue a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may be brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and prouoked. It may be tryed also, whether *Birds* may not haue some thing done to them, when they are *Young*, wherby they may be made to haue *Greater*, or *Longer Bills*; Or *Greater* and *Longer Talions*? And whether *Children* may not haue some *Wash*, or Some thing to make their *Teeth Better*, and *Stronger*? *Corall* is in vse as an *Helpe* to the *Teeth* of *Children*.

Some *Living Creatures* generate but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheepe*, *Wilde Conneyes*, &c. And most *Sorts* of *Birds*, and *Fishes*: Others at any time of the *Yeare*, as *Men*; And all *Domesticke Creatures*; As *Horses*, *Hogges*, *Dogges*, *Cats*, &c. The *Cause* of *Generation* at all *Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogges*, &c. which breed at all *Seasons*, are full of *Heat*, and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearfulnessse*, and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildnesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a dry *Substance* in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the Time of *Going to Rut* of *Deere* is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Earely about the Middle of *September*, they goe to *Rut* somewhat the sooner; If *Drought*, somewhat the later. So *Sheepe*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at cer-

Experiments
in Confort,
touching the
Generation and
Bearing of Li-
ving Creatures
in the Wombe.

tainc *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat*, and *Comfort* of the *Spring* preparcth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of *Generation*: For no *Creature* goeth to generate, whilst the *Female* is full; Nor whilst shee is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by *Experience*, that if you take the *Egges*, or *Young Ones*, out of the *Nests* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759

Of *Living Creatures*, some are *Longer time* in the *Wombe*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six *Moneths*; *Doe's* goe about nine *Moneths*; *Mares* eleuen *Moneths*; *Bitches* nine *Weekes*; *Elephants* are said to goe two *Yeares*; For the *Receiued Tradition* of ten *Yeares* is *Fabulous*. For *Birds* there is double *Enquiry*; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe betweene the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds*, there is lesse *Diuerfity* of *Time*, than amongst other *Creatures*; yet some there is: For the *Hen* sitteth but three *Weekes*; The *Turkey-Hen*, *Goose*, and *Ducke*, a *Moneth*: *Quere* of others. The *Cause* of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Wombe*. For the former, those that are longer in *Comming* to their *Maturity* or *Growth*, are longer in the *Wombe*; As is chiefly scene in *Men*; And so *Elephants* which are long in the *Wombe*, are long time in *Comming* to their full *Growth*. But in most other *Kindes*, the *Constitution* of the *Wombe*, (that is, the *Hardnesse* or *Driness* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure *yeares* of *Growth*; And so the *Fawne*; And so the *Calf*. But *Whelps*, which come to their *Growth* (commonly) within three *Quarters* of a *yeare*, are but nine *Weekes* in the *Wombe*. As for *Birds*, as there is lesse *Diuerfity*, amongst them, in the time of their *Bringing forth*; So there is lesse *Diuerfity* in the time of their *Growth*; Most of them comming to their *Growth* within a *Twelue-Moneth*.

760

Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *Women*, *Lionesses*, &c. This may be caused, either by the *Quantity* of *Sperme* required to the *Producing One* of that *Kinde*; which if lesse be required, may admit greater *Number*; If more, fewer: Or by the *Partitions* and *Cells* of the *Wombe*, which may feuer the *Sperme*.

Experiments
in Confort,
touching Spe-
cies Visible.

761

There is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling*, in the *Bottom* of the *Water*, will shew greater; So will a *Candle* in a *Lanthorne*, in the *Bottom* of the *Water*. I haue heard of a *Practise*, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diner* Diueth, hauing his *Eyes* open, and swimmeth vpon his *Backe*;

Backe; whether (I say) he seeth *Things* in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh I know not.

762

It would be well boulded out, whether great *Refractions* may not be made vpon *Reflexions*, as well as vpon *Direct Beames*. For Example, We see that take an *Empty Basen*, put an *Angell of Gold*, or what you will, into it; Then goe so farre from the *Basen*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Basen* with *Water*, and you shall see it out of his Place, because of the *Reflexion*. To proceed therefore, put a *Looking-Glasse* into a *Basen of Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beauty*, and *Strangenesse*, were a fine Proofs: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cesterne* or *Poole of Water*, you shall place ouer against it a *Picture of the Deuill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Deuills Picture* aside, not seeing the *Water*, it will looke like a *Deuill* indeed. They haue an old Tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeple*s: Which was thought to be done by *Glasses*, when he walked vpon the *Ground*.

A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, Partly because *Motion* doth discusse the *Torpor* of *Solide Bodies*; Which beside their *Motion of Gravity*, haue in them a *Naturall Appetite*, not to moue at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* vpon which it resteth, a stronger *Compression* of *Parts*, than it hath of it Selfe: And therefore needeth more *Force* to be put in *Motion*. For if a *Weighty Body* be *Penfile*, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* very neare as easily, as if it were already in *Motion*.

Experiments
in Confort,
touching Im-
pulsion, and Per-
cussion.

763

A *Body Over-great*, or *Over-small*, will not be throwne so farre, as a *Body of a Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *Proportion*, betweene the *Body Moued*, and the *Force*, to make it moue well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moueth*, and the *Resistance* of the *Body* that is *Moued*: And if the *Body* be too great, it yeeldeth too little; And if it be too small, it resisteth too little.

764

It is *Common Experience*, that no *Weight* will presse or cut so strong, being laid vpon a *Body*, as *Falling*, or *strucken* from aboue. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moued*, haue by *Impulsion*, or by the *Motion of Gravity continued*, a *Compression* in them, as well down-wards, as they haue when they are throwne, or *Shot thorow the Aire*,

765

forwards.

forwards. I conceiue also, that the quicke *Loose* of that *Motion*, preuenteth the *Resistance* of the *Body* below; And *Priority* of the *Force*, (alwaies,) is of great *Efficacy*; As appeareth in infinite *Instances*.

Experiment
Solitary, touching
Tittillation.

766

Tickling is most in the *Soles* of the *Feet*, and vnder the *Arme-Holes*, and on the *Sides*. The *Cause* is, the *Thinness* of the *Skin* in those *Parts*; Ioynd with the *Rareness* of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinness* of the *Skin*, and *Suddenness*, and *Rareness* of *Touch*, doe further: For we see, a *Feather*, or a *Rush*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddenness*; We see no *Man* can tickle himselfe: Vvee see also, that the *Palme* of the *Hand*, though it hath as *Thinne* a *Skin*, as the other *Parts* Mentioned, yet is not *Ticklish*, because it is accustomed to be *Touched*. *Tickling* also causeth *Laughter*. The *Cause* may be, the *Emission* of the *Spirits*, and so of the *Breath*, by a *Flight* from *Tittillation*; For vpon *Tickling*, we see there is euer a *Starting*, or *Shrinking* away of the *Part*, to auoid it; And we see also, that if you *Tickle* the *Nostrills*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emission* of the *Spirits*, that doe likewise expell the *Moisture*. And *Tickling* is euer *Painfull*, and not well endured.

Experiment
Solitary, touching the
Scarcity of Raine in
Egypt.

767

It is strange, that the *Riuer* of *Nilus*, Over-flowing, as it doth, the *Country* of *Egypt*, there should be neuerthelesse little or no *Raine* in that *Countrey*. The *Cause* must be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be ascribed, either vnto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not so much as *Standing Waters*; Or else to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much, as *Waters Raw*; No more than *Waters* vpon the *Fire* doe vapour so much, after some time of *Boyling*, as at the first. And it is true, that the *Water* of *Nilus* is sweeter than other *Waters* in *Taste*; And it is excellent *Good* for the *Stone*, and *Hypochondriacall Melancholy*; Which sheweth it is *Lenefying*: And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without *Shade*, either of *Woods*, or *Hills*; Whereby the *Sunne* must needs haue great *Power* to *Concoct* it. As for the *Aire*, (from whence I conceiue this *Want* of *Showers* commeth chiefly;) The *Cause* must be, for that the *Aire* is, of it selfe, *Thin* and *Thirsty*; And as soone as euer it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment
Solitary, touching
Clarification.

768

It hath beene touched in the *Title* of *Percolations*, (Namely such as are *inwards*;) that the *Whites* of *Eggs*, and *Milke*, doe *clarifie*; And it is certaine, that in *Egypt*, they prepare and *clarifie* the *Water* of *Nile*, by putting it into great *Jarres* of *Stone*, and *Stirring* it about with a few

Stamped

Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessell*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

There be scarce to be found any *Vegetables*, that haue *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Egypt*, a *Plant* which is Long, Leauelless, Browne of Colour, and Branched like *Corall*, saue that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the People thereabouts haue a Superstitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Easie Delinerance*.

The *Crystalline Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pausa*, by the *Riuer Ticinum*; And the *Ashes* of a *Weed* called by the *Arabs Kall*, which is gathered in a *Desart* betweene *Alexandria* and *Rosetta*; And is by the *Egyptians* vsed first for *Fuell*; And then they crush the *Ashes* into Lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glasse-workes*.

It is strange, and well to be noted, how long *Carkasses* haue continued *Vncorrupt*, and in their former *Dimensions*; As appeareth in the *Mummies* of *Egypt*; Hauing lasted, as is conceiued, (some of them,) three thousand yeeres. It is true, they finde Meanes to draw forth the *Brains*, and to take forth the *Entrailes*, which are the *Parts* aptest to corrupt. But that is nothing to the Wonder: For wee see, what a Soft and Corruptible *Substance* the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Observation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which we conceiue to be so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that *Haste* to *Corruption*, that is conceiued. And therefore *Bodies*, in *Shining-Amber*; In *Quicke-Siluer*; In *Balmes*, (whereof wee now speake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conservatories* of *Snow*; &c. are preserued very long. It need not goe for Repetition, if we resume againe that which wee said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you prouide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The First is, that the *Aire* be excluded; For that vndermineth the *Body*, and conspireth with the *Spirit* of the *Body* to dissolve it. The Second is, that the *Body* *Adjacent* and *Ambient* be not *Commateriall*, but meerely *Heterogeneall* towards the *Body* that is to be preserued: For if Nothing can be receiued by the One, Nothing can issue from the Other; Such are *Quick-Siluer*, & *White-Amber*, to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserued, be not of that *Grasse*, that it may corrupt within it selfe, although no Part of it issue into the *Body* *Adjacent*: And therefore it must be rather *Thinne*, and *Small*, than of *Bulke*. There is a Fourth *Remedie* also, which is; That

Experiment
Solitary touching
Plants
without *Leaves*

769

Experiment
Solitary, touching
the *Materials* of *Glasse*.

770

Experiment
Solitary touching
Prohibition of *Putrefaction*,
and the
Long Conservation
of *Bodies*.

771

That if the *Body* to be preserved be of *Bulke*, as a *Corps* is, then the *Body* that Incloseth it, must haue a Vertue to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Putrefaction* will play within, though Nothing issue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of *King Numa*; It being some foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to be seene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as fresh, as if they had beene but newly Written; being written in *Parchment*, and couered ouer with *Watch-Candles* of *Wax*, three or foure fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Egyptians* were; Which was the *Cause* that the *Body* was vtterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Caesar* visited the *Sepulchre* of *Alexander the Great*, in *Alexandria*, he found the *Body* to keepe his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *Body* was so Tender, as *Caesar* touching but the *Nose* of it, defaced it. Which maketh mee finde it very strange, that the *Egyptian Mummies* should be reported to be as Hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very Materiall; Namely, that the Ancient *Egyptian Mummies*, were shrowded in a Number of Folds of *Linnen*, besmeared with *Gums*, in manner of *Seare-Cloth*; Which it doth not appeare was practised vpon the *Body* of *Alexander*.

Experiment
Solitary, touching the
Abundance of Nitre in certaine
Sea-Shoures.

772

Neare the *Castle* of *Catie*, and by the *Wells* of *Affan*, in the *Land* of *Idumea*, a great Part of the Way, you would thinke the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, vpon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

Experiment
Solitary, touching Bodies
that are borne
vp by Water.

773

The *Dead-Sea*, which vomiteth vp *Bitumen*, is of that *Crafsitude*, as *Lining Bodies* bound Hand and Foot, cast into it, haue beene borne vp, and not sunke. Which sheweth, that all *Sinking* into *Water*, is but an *Ouer-Weight* of the *Body*, put into the *Water*, in respect of the *Water*: So that you may make *Water* so strong, and heavy, of *Quicke-Siluer*, (perhaps,) or the like, as may beare vp *Iron*: Of which I see no Vse, but *Imposture*. Wee see also, that all *Metalls*, except *Gold*, for the same reason, swimme vpon *Quicke-Siluer*.

Experiment
Solitary, touching
Fuel, that consumeth
little, or nothing.

774

It is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make *Fires*,) which burneth like a *Coale*, and diminisheth not; But only waxeth Brighter, and Whiter. That it should doe so, is not strange; For wee see *Iron Red Hot* burneth, and consumeth not: But the Strangenesse is, that it should continue any
time

time so: For *Iron*, as soone as it is out of the Fire, deadeth straight-waies. Certainly, it were a Thing of great Vse, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: Neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamanders Wooll*; Being a Kinde of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this; *Flame* must be made of somewhat; And commonly it is made of some *Tangible Body*, which hath *Weight*: But it is not impossible, perhaps, that it should be made of *Spirit*, or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *Weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oile*, and *Wax*, and other *Candle-Staffe*, the *Flame* may continue, and the *Wicke* not burne.

Sea-Coale last longer than *Char-Coale*; And *Char-Coale* of *Roots*, being coaled into great Peeces, last longer than Ordinary *Char-Coale*. *Turfe*, and *Fest*, and *Cow-Sheards*, are cheape *Fuels*, and last long. *Small-Coale*, or *Briar-Coale*, powred vpon *Char-Coale*, make them last longer. *Sedge* is a cheape *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea-Coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-Coale-Men* vse it, priuily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be vsed purposely, and be made knowne, it is Sauing.

Experiment
Solitary Occo-
nomically tou-
ching Cheape
Fuell.

775

It is, at this Day, in vse, in *Gaza*, to couch *Pot-Sheards* or *Vessels* of *Earth*, in their *Walls*, to gather the *Wind* from the Top, and to passe it downe in Spouts into *Roomes*. It is a Deuice for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italie*, and *Spaine*, for *Freshnesse*, and Gathering the *Winds*, and *Aire*, in the Heats of *Summer*. But they be but *Pennings* of the *Winds*, and *Enlarging* them againe, and *Making* them *Reuerberate*, and goe round in *Circles*, rather than this Deuice of Spouts in the *Wall*.

Experiment
Solitary, tou-
ching the Ga-
thering of Wind
for Freshnesse.

776

There would be vsed much diligence, in the Choice of some *Bodies*, and *Places*, (as it were,) for the *Tasting* of *Aire*; to discover the *Wholesomenesse* or *Vnwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Confitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They be noble *Experiments*, that can make this *Discoverie*; For they serue for a *Naturall Dimination* of *Seasons*; Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

Experiment
Solitary tou-
ching the Tri-
als of Aires.

777

There is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *Water*, whereof *Castell* drinke; Which maketh them
giue

Experiment
Solitary tou-
ching Increa-

Experiments
Touching Milk in
Milch Beasts.

778

giue more *Milke*. Surely, there would be some better *Trialls* made of *Mixtures* of *Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keep* them from *Murraine*. It may be, *Chalke*, and *Nitre*, are of the best.

Experiment
Solitary, touch-
ing Sand of
the Nature of
Glasfe.

779

It is reported, that in the *Valley*, neare the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which, of all other, hath most *Affinitie* with *Glasfe*; In-
somuch as other *Mineralls*, laid in it, turne to a *Glasfe Substance*, with-
out the *Fire*; And againe *Glasfe* put into it, turneth into the *Mother-Sand*.
The Thing is very strange, if it be true: And it is likeliest to be Caused by
some *Naturall Fornace*, or *Heat* in the *Earth*: And yet they doe not speake
of any *Eruption* of *Flames*. It were good to trie in *Glasfe-Workes*, whe-
ther the *Crude Materialls* of *Glasfe*, mingled with *Glasfe*, already made, and
Re-moulten, doe not facilitate the *Making* of *Glasfe* with lesse *Heat*.

Experiment
Solitary, touch-
ing the
Growth of
Corall.

780

In the *Sea*, vpon the *South-West* of *Sicilie*, much *Corall* is found. It is
a *Sub-Marine Plant*. It hath no *Leaves*: It brancheth only when it is vn-
der *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the
Aire, it becommeth *Hard*, and *Shining Red*, as wee see. It is said also,
to haue a *White Berry*; But wee finde it not brought ouer with the *Corall*.
Belike it is cast away as nothing worth: Inquire better of it, for the *Dis-
couerie* of the *Nature* of the *Plant*.

Experiment
Solitary, touch-
ing the Ga-
thering of
Manna.

781

The *Manna* of *Calabria* is the best, and in most *Plenty*. They gather
it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberry Trees*,
as grow in the *Valley's*. And *Manna* falleth vpon the *Leaves* by *Night*, as
other *Deawes* doe. It should seeme, that before those *Deawes* come vp-
on *Trees* in the *Valley's*, they dissipate, and cannot hold out. It should
seeme also, the *Mulberry-Leafe*, it selfe, hath some *Coagulating Vertue*,
which inspissateth the *Deaw*; for that it is not found vpon other *Trees*:
And wee see by the *Silke-Worme*, which feedeth vpon that *Leafe*, what a
Dainty Smooth Iuyce it hath; And the *Leaves* also, (especially of the
Blacke Mulberry,) are somewhat *Bristly*, which may helpe to preserue
the *Deaw*. Certainly, it were not amisse, to obserue a little better, the
Deawes that fall vpon *Trees*, or *Herbs*, Growing on *Mountaines*; For, it
may be, many *Deawes* fall, that spend before they come to the *Valleys*.
And I suppose, that he that would gather the best *May-Deaw* for *Medi-
cine*, should gather it from the *Hills*.

Experiment
Solitary, touch-
ing the Cor-
recting of Wine.

782

It is said, they haue a manner, to prepare their *Greeke-Wines*, to keepe
them from *Fuming*, and *Inebriating*, by adding some *Sulphur*, or *Allome*:
Whereof the one is *Vnctuous*, and the other is *Astringent*. And certaine it
is, that those two *Natures* doe best repress *Fumes*. This *Experiment*
would be transferred, vnto other *Wine*, and *Strong Beere*, by Putting in
some like *Substances*, while they worke; Which may make them both
to *Fume* lesse, and to *Inflame* lesse.

It

It is conceiued by some, (not improbably,) that the reason, why *Wilde-Fires*, (VWhereof the principall Ingredient is *Bitumen*;) doe not quench with *Water*, is, for that the first *Concretion* of *Bitumen* is a *Mixture*, of a *Fiery*, and *Watry Substance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court of Vulcan*, you shall heare, vnder the *Earth*, a Horrible Thundring of *Fire*, and *Water*, confliſting together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; VWhereas *Aetna*, and *Vesuuins*, and the like, which conſiſt vpon *Sulphur*, ſhoot forth *Smoake*, and *Aſhes*, and *Pumice*, but no *Water*. It is reported alſo, that *Bitumen* Mingled with *Lime*, and Put vnder *Water*, will make, as it were, an *Artificiall Rocke*; The *Subſtance* becommeth ſo Hard.

Experiment Solitary touching the Materials of *Wilde-Fire*.

783

There is a *Cement*, compounded of *Floure*, *Whites* of *Egges*, and *Stone* powdered, that becommeth Hard as *Marble*; wherewith *Piscina mirabilis*, neare *Cuma*, is ſaid to haue the *Walls* Plastered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *Whites* of *Egges*, and *Gummi Dragon*, made into *Paste*, will in a few dayes harden to the Hardneſſe of a *Stone*.

Experiment Solitary, touching *Plaster* growing as Hard as *Marble*.

784

It hath beene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Vlcers* or *Hurts* in the *Leggs*, are Hard to Cure; And in the *Head* more Eaſie. The *Cauſe* is, for that *Vlcers* or *Hurts* in the *Leggs* require *Deſiccation*, which by the *Deſluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwiſe *Drineſſe* maketh them more apt to *Consolidate*. And in *Moderne Obſeruation*, the like difference hath beene found, betweene *French-Men*, and *English-Men*; VWhereof the ones *Conſtitution* is more *Dry*, and the others more *Moift*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *English-Man*.

Experiment Solitary touching *Iudgement* of the Cure in ſome *Vlcers* and *Hurts*.

785

It hath beene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cauſe a *Fenourous Diſpoſition* of the *Yeare*; But with *Raine*, not. The *Cauſe* is, for that *Southerne Winds* doe, of themſelues, qualifie the *Aire*, to be apt to cauſe *Feuers*; But when *Showers* are ioyned, they doe Refrigerate in Part, and Checke the Sultry Heat of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coaſts*, becauſe the *Vapour* of the *Sea*, without *Showers*, doth reſreſh.

Experiment Solitary, touching the *Healthfulneſſe* or *Unhealthfulneſſe* of the *Southerne Wind*.

786

It hath beene noted by the *Ancients*, that *Wounds* which are made with *Brasse*, heale more eaſily, than *Wounds* made with *Iron*. The *Cauſe* is, for that *Brasse* hath, in it ſelte, a *Sanatiue Vertue*; And ſo in the very *Instant* helpeth ſomewhat: But *Iron* is *Corroſiue*, and not *Sanatiue*. And therefore it were good, that the *Inſtruments* which are vſed by *Chirurgians* about *Wounds*, were rather of *Brasse*, than *Iron*.

Experiment Solitary, touching *Wounds*.

787

vuln.

Experiment
Solitary tou-
ching Mortifi-
cation by Cold.

788

147. ps.
16. v.

In the *Cold Countries*, when Mens *Noses*, and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a Fire, they rot off presently. The *Cause* is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Putrefaction* is made Compleat. But *Snow* Put vpon them, helpeth; For that it preserueth those *Spirits* that remaine, till they can reuiue; And besides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proued out of the *Text*; *Qui dat Nivem sicut Lanam, Gelu sicut Cineres spargit*. Whereby he did inferre, that *Snow* did warme like *Wooll*, and *Frost* did fret like *Asbes*. *Warme Water* also doth good; Because by little and little it openeth the Pores, without any sudden Working vpon the *Spirits*. This *Experiment* may be transferred vnto the *Cure* of *Gangrenes*, either Comming of themselves, or induced by too much Applying of *Opiates*: Wherein you must beware of *Dry Heat*, and resort to Things that are *Refrigerant*, with an Inward *Warmth*, and *Vertue* of Cherishing.

Experiment
Solitary tou-
ching Weight.

789

Weigh *Iron*, and *Aqua Fortis*, seuerally; Then dissolue the *Iron* in the *Aqua Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good *Weights*, as the *Bodies* did seuerally: Notwithstanding a good deale of *Wast*, by a thicke *Vapour*, that issueth during the *Working*: Which sheweth, that the *Opening* of a *Body*, doth increase the *Weight*. This was tried once, or twice, but I know not, whether there were any *Error*, in the *Triall*.

Experiment
Solitary tou-
ching the Su-
per-Natation of
Bodies.

790

Take of *Aqua-Fortis* two Ounces, of *Quick-silver* two Drachmes; (For that Charge the *Aqua-Fortis* will beare;) The *Dissolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the Increasing of the *Weight* of *Water*, will increase his *Power* of *Bearing*; As we see *Broine*, when it is Salt enough, will beare an *EGge*. And I remember well a *Physitian*, that vsed to giue some *Minerall Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in Ordinary *Water*. But it seemeth, the *Weight* of the *Quick-silver*, more than the *Weight* of a *Stone*; doth not compensate the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment
Solitary, tou-
ching the Flying
of Vnequall Bo-
dies in the Aire.

791

Let there be a *Body* of *Vnequall Weight*; (As of *Wood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *Weightier End* will recover to be Forwards; Vnlesse the *Body* be Ouer-long. The *Cause* is, for that the more *Dense Body*, hath a more Violent *Pressure* of the *Parts*, from the first *Impulsion*; Which is the *Cause*, (though heretofore not found out, as hath been often said,) of all *Violent Motions*: And when the *Hinder Part* moueth swifter, (for that it lesse endureth *Pressure* of *Parts*,) than the *Forward Part* can make way for it, it must needs be, that the *Body* turne ouer: For (turned) it can more easily draw forward the *Lighter Part*. *Galileus* noteth it well; That if an *Open Trough*, wherein *Water* is, be driuen faster than the *Water* can.

can follow, the *Water* gathereth vpon an heape, towards the *Hinder End*, where the *Motion* began; Which he suppoſeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* ouer-runneſh the *Water*. Which *Theory*, though it be falſe, yet the firſt *Experiment* is true. As for the *Inequality* of the *Preſſure* of *Parts*, it appeareth manifeſtly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *Wood*, of the ſame *Magnitude*, and *Shape*, and throw them with equall *Force*, you cannot poſſibly throw the *Wood*, ſo farre, as the *Stone*, or *Iron*.

It is certaine, (as it hath beene formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you daſh a *Stone* againſt a *Stone* in the *Bottom* of the *Water*, it maketh a *Sound*. So a long *Pole* ſtrucke vpon *Gravel*, in the *Bottom* of the *Water*, maketh a *Sound*. Nay, if you ſhould thinke that the *Sound* commeth vp by the *Pole*, and not by the *Water*, you ſhall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no *Solide Body*, whereby the *Sound* can aſcend.

All *Obiects* of the *Senſes*, which are very *Offenſive*, doe cauſe the *Spirits* to retire; And vpon their *Flight*, the *Parts* are (in ſome degree) deſtitute; And ſo there is induc'd in them a *Trepidation* and *Horror*. For *Sounds*, we ſee that the *Grating* of a *Saw*, or any very *Harſh Noiſe*, will ſet the *Teeth* on edge, and make all the *Body* ſhauer. For *Taſtes*, we ſee that in the Taking of a *Potion*, or *Pills*, the *Head*, and the *Necke* ſhake. For *Odious Smells*, the like Effect followeth, which is leſſe perceiu'd, becauſe there is a Remedy at hand, by Stopping of the *Noſe*: But in *Horſes*, that can vſe no ſuch Help, we ſee the *Smell* of a *Carrion*, eſpecially of a *Dead Horſe*, maketh them fly away, and take on, almoſt as if they were Mad. For *Feeling*, if you come out of the *Sunne*, ſuddenly, into a *Shade*, there followeth a *Chilneſſe* or *Shiuering* in all the *Body*. And euen in *Sight*, which hath (in effect) no *Odious Obiect*, Comming into *Sudden Darkneſſe*, induceth an *Offer* to *Shauer*.

There is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath *Windownes* onely from aboue: It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neare Fifty; Hauing a *Doore* in the *Middeſt*. It reporteth the *Voice*, twelue or thirteene times, if you ſtand by the *Cloſe End-Wall*, ouer againſt the *Doore*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* ſoundeth, as if it came from aboue the *Doore*. And if you ſtand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you ſtand in the *Doore*, or in the *Middeſt* juſt ouer againſt the *Doore*, not. Note that all *Eccho's* ſound better againſt *Old walls*, than *New*; Becauſe they are more *Dry*, and *Hollow*.

Experiment Solitary, touching *Water*, that it may be the *Medium* of *Sounds*.

792

Experiment Solitary, of the *Flight* of the *Spirits* vpon *Odious Obiects*.

793

Experiment Solitary, touching the *Super-Reſlexion* of *Eccho's*.

794

Experiment
Solitary tou-
ching the Force
of Imagination,
Imitating that
of the Sense.

795

Those *Effects*, which are wrought by the *Percussion* of the *Sense*, and by *Things* in *Fact*, are produced likewise, in some degree, by the *Imagination*. Therefore if a Man see another eat *Soure* or *Acide Things*, which set the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that hee that seeth the *Thing* done by another, hath his owne *Teeth* also set on edge. So if a Man see another turne swiftly, and long; Or if he looke vpon *Wheeles* that turne, Himselfe waxeth *Turne-sicke*. So if a Man be vpon an *High Place*, without *Railes*, or good Hold, except he be vsed to it, he is Ready to Fall: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many vpon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, Themselves are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment
Solitary, tou-
ching Preserva-
tion of Bodies.

796

Take a *Stoeke-Gilly-Flower*, and tye it gently vpon a *Sticke*, and put them both into a *Stoope Glasse*, full of *Quick-siluer*, so that the *Flower* be couered: Then lay a little *Weight* vpon the Top of the *Glasse*, that may keepe the *Sticke* downe; And looke vpon them after foure or fise daies; And you shall finde the *Flower* Fresh, and the *Stalke* Harder, and lesse *Flexible*, than it was. If you compare it with another *Flower*, gathered at the same time, it will be the more manifest. This sheweth, that *Bodies* doe preserue excellently in *Quick-siluer*; And not preserue only, but, by the *Coldnesse* of the *Quick-siluer*, *Indurate*; For the *Freshnesse* of the *Flower* may be meerely *Conservation*; (which is the more to be obserued, because the *Quick-siluer* presseth the *Flower*;) But the *Stiffenesse* of the *Stalke*, cannot be without *Induration*, from the Cold (as it seemeth,) of the *Quick-siluer*.

Experiment
Solitary, tou-
ching the
Growth, or
Multiplying of
Metalls.

797

It is reported by some of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the Ground, if it be well *Watred*, will increase into *Greater Peeces*. This is certaine, and knowne of Old; That *Lead* will multiply, and Increase; As hath beene seene in *Old Statua's* of *Stone*, which haue beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time,) there appeared, that the *Lead* did swell; Insomuch as it hanged vpon the *Stone* like *Warts*.

Experiment
Solitary, tou-
ching the
Drowning of
the more Base
Metall in the
more Precious.

798

I call *Drowning* of *Metalls*, when that the *Baser Metall*, is so incorporate with the more *Rich*, as it can by no Meanes be separated againe: which is a kinde of *Version*, though False: As if *Siluer* should be inseparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Siluer*. The *Ancient Electrum* had in it a Fifth of *Siluer* to the *Gold*; And made a *Compound Metall*, as fit for most vses, as *Gold*; And more Resplendent, and more Qualified in some other Properties; But then that was easily Separated. This to doe priuily, or to make the *Compound* passe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it be done Auowedly, and without Disguizing, it may be a great *Sauing* of the

the *Richer Metall*. I remember to haue heard of a Man, skilfull in *Metalls*, that a Fifteenth Part of *Siluer*, incorporate with *Gold*, will not be Recovered by any *Water of Separation*; Except you put a Greater *Quantity* of *Siluer*, to draw to it the *Lesse*; which (he said) is the last Refuge in *Separations*. But that is a tedious way, which no Man (almost) will thinke on. This would be better enquired; And the *Quantity* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Siluer* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Siluer*, (*Lead* being the *Weightier Metall*,) will not be detected; If you take so much the more *Siluer*, as will counteruaile the *Ouer-Weight* of the *Lead*.

Gold is the onely *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficulty. The *Melting* sheweth that it is not *Ieiune*, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Coacervation* of them: Whereby they haue the lesse Appetite, and no Meanes (at all) to issue forth. It were good therefore to try, whether *Glasse Re-moulten* doe leese any *Weight*? For the *Parts* in *Glasse* are euently Spred; But they are not so Close as in *Gold*; As we see by the Easie Admission of *Light*, *Heat*, and *Cold*; And by the *Smalnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which haue little, or no *Spirit*: So as there is nothing to fly out; As wee see in the *Stuffe*, whereof *Coppells* are made; Which they put into *Furnaces*; Vpon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The *Euen Spreading* both of the *Spirits*, and *Tangible Parts*; The *Closenesse* of the *Tangible Parts*; And the *Ieiunenesse* or *Extreme Comminution* of *Spirits*: Of which Three, the Two First may be ioyned with a *Nature Liquefiable*; The Last not.

It is a *Profound Contemplation* in *Nature*, to consider of the *Emptinesse*, (as we may call it,) or *Insatiation* of severall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it, with a kinde of Thirst, as not satisfied with his owne former Consistence; For else it would neuer receiue them in so suddenly, and easily. *Water*, and all *Liquours*, doe hastily receiue *Dry* and more *Terrestriall Bodies*, Proportionable: And *Dry Bodies*, on the other side, drinke in *Waters*, and *Liquours*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *Watry Substances*,) *One is a Glue to another*. *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquours*, though themselves be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Asbes*; Nor apparently Porous: *Metalls* themselves doe receiue in readily *Strong-Waters*; And *Strong-Waters* likewise doe readily pierce into *Metalls*, and *Stones*: And that *Strong-Water* will touch vpon *Gold*, that will not touch vpon *Siluer*; And *conuerso*. And *Gold*, which

Experiment
Solitary touching
Fixation
of Bodies.

799

Experiment
Solitary, touching
the *Restless* Nature of
Things in
Themselves, and
their Desire to
change.

800

which seemeth by the *Weight*, to be the Closest, and most Solide *Body*, doth greedily drinke in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Consent. Of the *Cause* of this, and to what *Axiome* it may be referred, consider attentively; For as for the Pretty Assertion, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *Wandering Notion*. Onely *Flame* doth not content it selfe to take in any other *Body*; But either, to overcome and turne another *Body* into it Selfe, as by *Victory*; Or it Selfe to dye, and goe out.

NATV-



NATVRALL HISTORIE.

IX. Century.



IT is certaine, that all *Bodies* whatsoeuer, though they haue no *Sense*, yet they haue *Perception*: For when one *Body* is applied to another, there is a *Kinde of Election*, to embrace that which is *Agreeable*, and to exclude or expell that which is *Ingrate*: And whether the *Body* be *Alterant*, or *Altered*, euermore a *Perception* precedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception*, in some *Kinde of Bodies*, is farre more *Subtill* than the *Sense*; So that the *Sense* is but a dull *Thing* in *Comparison* of it: Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as

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Experiments
in Consort,
touching Per-
ception in Bodies
Insensible, tend-
ing to Natural
Dimination, or
Subtill Trials.

upon the Touch ; As when the Load-Stone draweth Iron ; or Flame fireth Naphtha of Babylon, a great distance off. It is therefore a Subject of a very Noble Enquiry, to enquire of the more Subtill Perceptions ; For it is another Key to open Nature, as well as the Sense ; And sometimes Better. And besides, it is a Principall Meanes of Naturall Diuination ; For that which in these Perceptions appeareth early, in the great Effects commeth long after. It is true also, that it serueth to discover that which is Hid, as well as to foretell that which is to Come ; As it is in many Subtill Trialls ; As to trie whether Seeds be old, or new, the Sense cannot informe ; But if you boile them in Water, the New Seeds will sprout sooner : And so of Water, the Taste will not discover the best Water ; But the Speedy Consuming of it, and many other Meanes, which we haue heretofore set downe, will discover it. So in all Physiognomy, the Lineaments of the Body will discover those Naturall Inclinations of the Minde, which Dissimulation will conceale, or Discipline will suppress. Wee shall therefore now handle only, those two Perceptions, which pertaine to Naturall Diuination, and Discovery : Leauing the Handling of Perception in other Things, to be disposed Elsewhere. Now it is true, that Diuination is attained by other Meanes ; As if you know the Causes ; If you know the Concomitants ; you may iudge of the Effect to follow : And the like may be said of Discovery ; But wee tie our Selues here, to that Diuination and Discovery chiefly, which is Caused by an Early, or Subtill Perception.

The Aptnesse or Propension of Aire, or Water, to Corrupt or Putrifie, (no doubt,) is to be found before it breake forth into manifest Effects of Diseases, Blastings, or the like. Wee will therefore set downe some Prognosticks of Pestilentiall and Vnwholsome Yeares.

801

The Wind blowing much from the South, without Raine ; And Warmth in the Oake-Apple ; haue beene spoken of before. Also the Plenty of Frogs, Grasshoppers, Flies, and the like Creatures bred of Putrefaction, doth portend Pestilentiall Yeares.

802

Great, and Early Heats in the Spring, (and namely in May.) without Winds, portend the same ; And generally so doe Yeares with little Wind, or Thunder.

Great

Great Droughts in Summer, lasting till towards the End of August, and some Gentle Showres vpon them; And then some Drie Weather againe; Doe portend a Pestilent Summer, the Yeare following: For about the End of August, all the Sweetnesse of the Earth, which goeth into Plants and Trees, is exhaled; (And much more if the August be dry;) So that nothing then can breathe forth of the Earth, but a grosse Vapour, which is apt to Corrupt the Aire: And that Vapour, by the first Showres, if they be Gentle, is released, and commeth forth abundantly. Therefore they that come abroad soone after those Showres, are commonly taken with Sicknesse: And in Affricke, no Body will stirre out of doores, after the first Showres. But if the Showres come vehemently, then they rather wash and fill the Earth, than giue it leaue to breathe forth presently. But if Drie Weather come againe, then it fixeth and continueth the Corruption of the Aire, vpon the first Showres begun; And maketh it of ill Influence, euen to the Next Summer; Except a very Frostie Winter discharge it; Which seldome succeedeth such Droughts.

803

808

818

The Lesser Infections, of the Small Pockes, Purple Feuers, Agues, in the Summer Precedent, and houering all Winter, doe portend a great Pestilence in the Summer following; For Putrefaction doth not rise to his height at once.

804

It were good to lay a Peece of Raw Flesh, or Fish, in the Open Aire; And if it Putrefie quickly, it is a Signe of a Disposition in the Aire to Putrefaction. And because you cannot be informed, whether the Putrefaction be quicke or late, except you compare this Experiment with the like Experiment in another Yeare, it were not amisse, in the same Yeare, and at the same Time, to lay one Peece of Flesh, or Fish, in the Open Aire, and another of the same Kinde and Bignesse, within Doores: For I iudge, that if a generall Disposition be in the Aire to Putrefie, the Flesh, or Fish, will sooner Putrefie abroad, where the Aire hath more power, than in the House, where it hath lesse, being many wayes corrected. And this Experiment would be made about the End of March: For that Season is likest to discouer, what the Winter hath done; And what the Summer following will doe vpon the Aire. And because the Aire (no doubt) receiueth great Tincture, and Infusion from the Earth; It were good to trie that Exposing of Flesh, or Fish, both vpon a Stake of Wood, some height about the Earth, and vpon the Flat of the Earth.

805

818

Take May-Dew, and see whether it putrefie quickly, or no? For that likewise may disclose the Qualitie of the Aire, and Vapour of the Earth, more or lesse Corrupted.

806

A Drie March, and a Drie May, portend a Wholesome Summer, if there be a Showring Aprill betweene: But otherwise, it is a Signe of a Pestilentiall Yeare.

807

As the Discouerie of the Disposition of the Aire, is good for the Prognosticks of Wholesome, and Vnwholesome Yeares; So it is of much more vse, for the Choice of Places to dwell in: At the least, for Lodges, and Retiring Places for Health; (For Mansion Houses respect Provisions, as well

808

as *Health*; Wherein the *Experiments* aboue mentioned may serue.

809

But for the *Choice* of *Places*, or *Seats*, it is good to make *Triall*, not only of *Aptnesse* of *Aire* to corrupt, but also of the *Moisture* and *Driness* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may concerne *Health* diuersly. Wee see that there be some *Houses*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Waincoats* will also sweat more; so that they will almost run with *Water*: All which, (no doubt,) are caused chiefly by the *Moistnesse* of the *Aire*, in those *Seats*. But because it is better to know it, before a *Man* buildeth his *House*, than to finde it after, take the *Experiments* following.

810

Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would trie, comparing it with some other *Places*; And see whether it doth not moisten, and make the *Wooll*, or *Sponge*, &c. more *Ponderous*, than the other? And if it doe, you may iudge of that *Place*, as Situate in a *Grosse*, and *Moist Aire*.

811

Because it is certaine, that in some *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more *Vnequall*, than in Others; And *Inequalitie* of *Aire* is euer an *Enemy* to *Health*; It were good to take two *Weather-Glasses*, *Matches* in all things, and to set them, for the same *Houres* of One day, in severall *Places*, where no *Shade* is; nor *Enclosures*: And to marke, when you set them, how farre the *Water* commeth; And to compare them, when you come againe, how the *Water* standeth then: And if you finde them *Vnequall*, you may be sure that the *Place* where the *Water* is lowest, is in the *Warmer Aire*, and the other in the *Colder*. And the greater the *Inequalitie* be, of the *Ascent*, or *Descent* of the *Water*, the greater is the *Inequalitie* of the *Temper* of the *Aire*.

812

The *Predictions* likewise of *Cold* and *Long Winters*, and *Hot* and *Drie Summers*, are good to be knowne; As well for the *Discoverie* of the *Causes*, as for diuers *Provisions*. That of *Plenty* of *Hawes*, and *Heps*, and *Briar-Berries*, hath beene spoken of before. If *Waincoats*, or *Stone*, that haue vsed to Sweat, be more drie, in the Beginning of *Winter*; Or the *Drops* of the *Eaves* of *Houses* come more slowly downe, than they vse; it portendeth a *Hard* and *Frostie Winter*. The *Cause* is, for that it sheweth an *Inclination* of the *Aire*, to *Drie Weather*; which in *Winter* is euer ioyned with *Frost*.

813

Generally, a *Moist* and *Cool* *Summer*, portendeth a *Hard Winter*. The *Cause* is, for that the *Vapours* of the *Earth*, are not dissipated in the *Summer*, by the *Sunne*; And so they rebound vpon the *Winter*.

814

A *Hot* and *Drie Summer*, and *Autumne*, and especially if the *Heat* and *Drought* extend farre into *September*, portendeth an *Open Beginning* of *Winter*; And *Colds* to succeed, toward the latter Part of the *Winter*, and the Beginning of the *Spring*: For till then, the former *Heat* and *Drought* beare the Sway; And the *Vapours* are not sufficiently Multiplied.

815

An *Open* and *Warmer Winter* portendeth a *Hot* and *Drie Summer*: For the *Vapours* disperse into the *Winter Showres*; Whereas *Cold* and *Frost* keepeth

keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

Birds that vse to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *Weather*, according to that *Country* whence they came: As the *Winter-Birds*, (namely *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with vs shew *Cold Winters*. And if it be in the same *Country*, then they shew a *Temperature* of *Season*, like vnto that *Season* in which they come: As *Swallows*, *Bats*, *Cuckoos*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.

816

The *Prognosticks*, more Immediate, of *Weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* vpon the *Shoare*; And the *Murmur* of *Winds* in the *Woods*, without apparent *Wind*; shew *Wind* to follow: For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceiued, except they be pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Canes* likewise portendeth as much.

817

The *Vpper Regions* of the *Aire*, perceiue the *Collection* of the *Matter* of *Tempest*, and *Winds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kinde you shall finde a Number of *Instances* in our *Inquisition De Ventis*.

818

Great Mountaines haue a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *Wales*, when certaine *Hills* haue their *Night-Caps* on, they meane *Mischiefe*. The *Cause* is, for that *Tempests*, which are for the most part bred aboue, in the *Middle Region*, (as they call it,) are soonest perceiued to collect in the *Places* next it.

819

The *Aire*, and *Fire*, haue *Subtill Perceptions* of *Wind Rising*, before *Men* finde it. Wee see the *Trembling* of a *Candle* will discover a *Wind* that otherwise wee doe not feelee; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be vnquiet; And so doe *Coales* of *Fire* by Casting off the *Asbes* more than they vse. The *Cause* is, for that no *Wind*, at the first, till it hath strooke and driven the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to moue, than *Aire*: And for the *Asbes*, it is no maruell, though *Wind* vnperceiued shake them off; For wee vsually trie, which way the *Wind* bloweth, by casting vp *Grasse*, or *Chaffe*, or such light Things, into the *Aire*.

820

When *Wind* expireth from vnder the *Sea*; As it causeth some *Resounding* of the *Water*, (whereof wee spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceiued by the *Sense*, vntill there be an *Eruption* of a great *Quantitie*, from vnder the *Water*; And so it getteth into a *Body*: Whereas in the first *Putting up* it commeth in little *Portions*.

821

We spake of the *Asbes*, that *Coales* cast off; And of *Grasse*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moueth, when we finde no *Wind*,

822

Wind, sheweth a *Wind* at hand: As when *Feathers*, or *Downe* of *Thistles*, fly to and fro in the *Aire*.

For *Prognosticks* of *Weather* from *Living Creatures*, it is to be noted; That *Creatures* that Liue in the *Open Aire*, (*Sub Diô*,) must needs haue a *Quicker Impression* from the *Aire*, than *Men* that liue most within *Doores*; And especially *Birds*, who liue in the *Aire*, freest, and clearest; And are aptest by their *Voice*, to tell *Tales*, what they finde; And likewise by the *Motion* of their *Flight* to expresse the same.

823

Water-Fowles, (as *Sea-Gulls*, *Mare-Hens*, &c.) when they flocke and fly together, from the *Sea* towards the *Shores*; And contrariwise, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *Waters* with their *Wings*; doe fore-shew *Raine*, and *Wind*. The *Cause* is, *Pleasure*, that both *Kindes* take in the *Moistnesse*, and *Density* of the *Aire*: And so desire to be in *Motion*, and vpon the *Wing*, whither soeuer they would otherwise goe: For it is no Maruell, that *Water-Fowle* doe liue most in that *Aire*, which is likest *Water*; And *Land-Birds* also, (many of them,) delight in *Bathing*, and *Moist Aire*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seeme to call vpon *Raine*: All which is but the *Comfort* they seeme to receiue in the *Relenting* of the *Aire*.

824

The *Heron*, when she soareth high, (so as sometimes she is seene to passe ouer a *Cloud*,) sheweth *Winds*: But *Kites* flying aloft, shew *Faire* and *Dry Weather*. The *Cause* may be, for that they both mount most into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleasure in the *Aire*, that is *Condensed*: And besides, being but Heauy of *Wing*, needeth the Helpe of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossnesse* of the *Aire*, as the *Cold* and *Freshnesse* thereof; For being a *Bird of Prey*, and therefore *Hot*, she delighteth in the *Fresh Aire*; And (many times) flyeth against the *Wind*; As *Trouts*, and *Salmons* swimme against the *Streame*. And yet it is true also, that all *Birds* finde an *Ease* in the depth of the *Aire*; As *Swimmers* doe in a *Deepe Water*. And therefore when they are aloft, they can vphold themselues with their *Wings Spread*, scarce mouing them.

825

Fishes, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Dry*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Dry*, will fly it, and *Swimme Lower*.

826

Beasts doe take *Comfort*, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get vp betimes in the *Morning*, to feed, against *Raine*: And *Cattell*, and *Deere*, and *Conneyes*, will feed hard before *Raine*: And a *Heifer*, will put vp his *Nose*, and snuffe in the *Aire*, against *Raine*.

The

The *Trifoile*, against *Raine*, swelleth in the *Stalke*; and so standeth more vpright; For by *Wet*, *Stalkes* doe crect, and *Leaves* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Country People call the *Wincopie*; Which if it open in the *Morning*, you may be sure of a faire *Day* to follow.

827

Euen in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieue, either towards *Raine*, or towards *Frost*. For the One maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we see both *Extremes* bring the *Gout*.

828

Wormes, *Vermine*, &c. doe fore-shew (likewise) *Raine*: For *Earth-wormes* will come forth, and *Moules* will cast vp more, and *Fleas* bite more, against *Raine*.

829

Solide Bodies likewise fore-shew *Raine*. As *Stones*, and *Wainscot*, when they *Sweat*: And *Boxes*, and *Peggs* of *Wood*, when they *Draw*, and *Wind* hard; Though the Former be but from an Outward Cause; For that the *Stone*, or *Wainscot*, turneth and beateth backe the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe.

830

Appetite is moued chiefly by Things that are *Cold*, and *Dry*: The Cause is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth vpon Supply; And so is *Drinesse*: And therefore all *Soure Things*, (as *Vinegar*, *Iuyce* of *Lemons*, *Oyle* of *Vitrioll*, &c.) prouoke *Appetite*. And the *Disease*, which they call *Appetitus Caninus*, consisteth in the Matter of an *Acide* and *Glossy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moued by *Soure Things*; For that *Soure Things*, induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; Which is a great Cause of *Appetite*. As for the Cause, why *Onions*, and *Salt*, and *Pepper*, in Baked Meats, moue *Appetite*, it is by *Vellication* of those *Nerves*; For *Motion* whetteth. As for *Worme-wood*, *Oliues*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they moue *Appetite* by *Absterfion*. So as there be foure Principall Causes of *Appetite*; The *Refrigeration* of the *Stomach*, ioyned with some *Drinesse*; *Contraction*; *Vellication*; And *Absterfion*: Besides *Hunger*, which is an *Emptinesse*: And yet *Ouer Fasting* doth (many times) cause the *Appetite* to cease; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*, And such *Humours* as are *Light*, and *Cholericke*, which quench *Appetite* most.

Experiment Solitary, touching the Nature of Appetite in the Stomach.

831

It hath beene obserued by the *Ancients*, that where a *Raine-Bow* seemeth to hang ouer, or to touch, there breatheth forth a *Sweet Smell*. The Cause is, for that this happeneth but in certaine Matters, which haue in themselves some *Sweetnesse*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they also make the *Ground Sweet*: But none are so delicate as the *Dew* of the *Rain-bow*, where it falleth. It may be also, that the *Water* it selfe hath some *Sweetnesse*: For the *Raine-Bow* consisteth of a *Glomeration* of *Small Drops*, which cannot possibly fall, but from the *Aire*, that is very *Low*: And there-

Experiment Solitary, touching Sweetnesse of Odour from the Rain-bow.

832

therefore may hold the very *Sweetnesse* of the *Herbs*, and *Flowers*, as a *Distilled Water*: For *Raine*, and other *Dew*, that fall from high, cannot preserve the *Smell*, being dissipated in the drawing vp: Neither doe we know, whether some *Water* it selfe, may not haue some degree of *Sweetnesse*. It is true, that wee finde it sensibly in no *Poole*, *River*, nor *Fountain*; But good *Earth*, newly turned vp, hath a *Freshnesse*, and good *Scent*; Which *water*, if it be not too *Equall*, (For *Equall Objects* neuer moue the *Sense*,) may also haue. Certaine it is, that *Bay-Salt*, which is but a kinde of *Water Congealed*, will sometimes smell like *Violets*.

Experiment
Solitary, touch-
ing Sweet
Smells.

833

To *Sweet Smells* Heat is requisite, to Concoct the *Matter*; And some *Moisture* to Spread the *Breath* of them. For *Heat*, we see that *Woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moisture*, we see that Things too much *Dried*, lose their *Sweetnesse*: And *Flowers* growing, smell better in a *Morning*, or *Evening*, than at *Noone*. Some *Sweet Smells* are destroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pinckes*; And generally all *Flowers* that haue *Cool* and *Delicate Spirits*. Some continue both on the *Fire*, and from the *Fire*, As *Rose-Water*, &c. Some doe scarce come forth, or at least not so pleasantly, as by meanes of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Enclosed in a *Fast Body*: But (generally) those *Smells* are the most *Gratefull*, where the *Degree of Heat* is *Small*; Or where the *Strength* of the *Smell* is allayed; For these Things doe rather wooe the *Sense*, than Satiare it. And therefore the *Smell* of *Violets*, and *Roses*, exceedeth in *Sweetnesse* that of *Spices*, and *Gummes*; And the *Strongest Sort* of *Smells*, are best in a weft, a farre off.

Experiment
Solitary touch-
ing the cor-
poreall Substance
of Smells.

834

It is certaine, that no *Smell* issueth, but with *Emission* of some *Corporeall Substance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For wee see plainly, that *Smell* doth spread nothing that distance, that the other doe. It is true, that some *Woods* of *Orenges*, and *Heathes* of *Rose-Mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, since a *Peale* of *Ordnance* will do as much, which moueth in a small compass? Whereas those *Woods*, and *Heathes*, are of *Vast Spaces*: Besides we see that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloves*, &c. which sheweth them *Corporeall*; And doe Last a great while, which *Sounds*, and *Light* doe not.

Experiment
Solitary touch-
ing Fetide
and Fragrant
Odours.

835

The *Excrements* of most *Creatures* Smell ill; Chiefly to the same *Creature* that voideth them: For we see, besides that of *Man*, that *Pigeons*, and *Horses* thrive best, if their *Houses*, and *Stables* be kept Sweet; And so of *Cage-Birds*: And the *Cat* burieth that which shee voideth: And it holdeth chiefly in those *Beasts*, which feed vpon *Flesh*. *Dogs* (almost) onely of *Beasts*, delight in *Fetide Odours*; Which sheweth there is somewhat in their *Sense* of *Smell*, differing from the *Smells* of other *Beasts*. But the *Cause*, why *Excrements* smell ill, is manifest; For that the
Body

Body it selfe reiecteth them; Much more the *Spirits*: And we see, that those *Excrements*, that are of the *First Digestion*, Smell the worst; As the *Excrements* from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Urine*; And those that are from the *Third*, yet lesse; For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrefactions* are of an *Odious Smell*: For they smell either *Fetide*, or *Mouldy*. The *Cause* may be, for that *Putrefaction* doth bring forth such a *Consistence*, as is most *Contrary* to the *Consistence* of the *Body*, whilst it is *Sound*: For it is a meere dissolution of that *Forme*. Besides, there is another Reason which is *Profound*: And it is, that the *Objects* that please any of the *Senses*, haue (all) some *Equality*, and (as it were) *Order*, in their *Composition*: But where those are wanting, the *Object* is euer *Ingrate*. So *Mixture* of many *Disagreeing Colours* is euer vnpleasant to the *Eye*: *Mixture* of *Discordant Sounds* is vnpleasant to the *Eare*: *Mixture*, or *Hotch-Potch* of many *Tastes*, is vnpleasant to the *Taste*: *Harshnesse* and *Ruggednesse* of *Bodies*, is vnpleasant to the *Touch*: Now it is certaine, that all *Putrefaction*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Vnformed Mixture* of the *Part*. Neuerthelesse, it is strange, and seemeth to *Crosse* the former *Observation*, that some *Putrefactions* and *Excrements* doe yeeld *Excellent Odours*; As *Cinnet*, and *Muske*; And as some thinke *Amber-Greece*: For diners take it, (though vnprobably,) to come from the *Sperme* of *Fish*: And the *Mosse*, wee spake of from *Apple-Trees*, is little better than an *Excretion*. The Reason may be, for that there passeth in the *Excrements*, and remaineth in the *Putrefactions*, some good *Spirits*; especially where they proceed from *Creatures*, that are very *Hot*. But it may be also ioyned with a further *Cause*, which is more *Subtill*; And it is, that the *Senses* loue not to be *Ouerpleased*; But to haue a *Commixture* of somewhat that is in it selfe *Ingrate*. Certainly, we see how *Discords* in *Musicke*, falling vpon *Concords*, make the *Sweetest Straines*: And we see againe, what *Strange Tastes* delight the *Taste*; As *Red-Herrings*, *Caueary*, *Parmizan*, &c. And it may be, the same holdeth in *Smells*. For those kinde of *Smells*, that we haue mentioned, are all *Strong*, and doe *Pull* and *Vellicate* the *Sense*. And wee finde also, that *Places* where Men *Urine*, commonly haue some *Smell* of *Violets*: And *Urine*, if one hath eaten *Nutmegge*, hath so too.

The Sloathfull, Generall, and Indefinite Contemplations, and Notions, of the *Elements*, and their *Coniugations*; Of the *Influences* of *Heauen*; Of *Heat*, *Cold*, *Moisture*, *Drought*; *Qualities* *Active*, *Passiue*; And the like; haue swallowed vp the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to be set aside, being

but *Notionall*, and *ill Limited*; And *Definite Axiomes* are to be drawne out of *Measured Instances*: And so Assent to be made to the more *Generall Axiomes*, by *Scale*. And of these *Kindes of Processes of Natures*, and *Characters of Matter*, we will now set downe some *Instances*.

Experiment
Solitary, touch-
ing the Causes
of Putrefaction.

836

All *Putrefactions* come chiefly from the *Inward Spirits* of the *Body*; And partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatsoeuer else. And this last, by two *Meanes*: Either by *Ingresse* of the *Substance* of the *Ambient Body*, into the *Body Putrified*; Or by *Excitation* and *Sollicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Received Opinion, that *Putrefaction* is caused, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but *Nugation*: For *Cold* in *Things Inanimate*, is the greatest Enemy that is, to *Putrefaction*; though it extinguisheth *Vinification*, which euer consisteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Aduentine Heat*, be greatly *Predominant*, to the *Naturall Heat*, and *Spirits* of the *Body*, it tendeth to *Dissolution*, or *Notable Alteration*. But this is wrought by *Emission*, or *Suppression*, or *Suffocation*, of the *Native Spirits*; And also by the *Disordination*, and *Discomposure* of the *Tangible Parts*; And other *Passages of Nature*; And not by a *Conflict* of *Heats*.

Experiment
Solitary, touch-
ing Bodies
Vnperfectly
Mixt.

837

In *Versions*, or *Maine Alterations* of *Bodies*, there is a *Medium* between the *Body*, as it is at first, and the *Body Resulting*; which *Medium* is *Corpus imperfecte Mixtum*, and is *Transitory*, and not durable; As *Mists*, *Smokes*, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the first *Vinification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called, (by some of the *Ancients*,) *Inquination*, or *Inconcoction*, which is a *Kind* of *Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

Experiment
Solitary touch-
ing Concoction
and Crudity.

838

The word *Concoction*, or *Digestion*, is chiefly taken into vse from *Living Creatures*, and their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*; *Vrine* and *Excrements Concocted*; And the *Four Digestions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Seuerall Parts* of the *Body*;) are likewise called *Concoctions*: And they are all made to be the *Workes of Heat*: All which *Notions* are but ignorant *Catches* of a few *Things*, which are most *Obuius* to *Mens Observations*. The *Constantest Notion* of *Concoction* is, that it should signifie the *Degrees* of *Alteration* of one *Body* into another, from *Crudity* to *Perfect Concoction*; Which is the *Vltimity* of that *Action*, or *Processe*: And while the *Body* to be *Concocted* and *Altered*, is too strong for the *Efficient*, that should *Conuert*, or *Alter* it, whereby it resisteth and holdeth fast in some degree the first

Forme.

Forme, or Consistence,) it is (all that while,) *Crude, and Inconcoct*; And the *Processe* is to be called *Crudity and Inconcoction*. It is true, that *Concoction* is, in great part, the *Work* of *Heat*; But not the *Work* of *Heat* alone: For all Things, that further the *Conuerſion, or Alteration*, (as *Reſt, Mixture of a Body already Concocted, &c.*) are alſo *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Aſſimilation, or Abſolute Conuerſion and Subaction*; The other *Maturation*: whereof the Former is moſt conſpicuous in the *Bodies of Liuing Creatures*; In which there is an *Abſolute Conuerſion, and Aſſimilation* of the *Nouriſhment* into the *Body*: And likewise in the *Bodies of Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other, (which is *Maturation*,) is ſcene in *Liquours, and Fruits*; wherein there is not deſired, nor pretended, an vtter *Conuerſion*, but onely an *Alteration* to that *Forme*, which is moſt ſought, for *Mans uſe*; As in *Clarifying of Drinkes*; *Ripening of Fruits, &c.* But note, that there be two *Kindes of Abſolute Conuerſions*; The one is, when a *Body* is conuerted into another *Body*, which was before; As when *Nouriſhment* is turned into *Fleſh*; That is it which wee call *Aſſimilation*. The other is, when the *Conuerſion* is into a *Body* meere-ly New, and which was not before; As if *Siluer* ſhould be turned to *Gold*; or *Iron* to *Copper*: And this *Conuerſion* is better called, for diſtinction ſake, *Transmutation*.

There are alſo diuers other *Great Alterations of Matter, and Bodies*, beſides thoſe that tend to *Concoction, and Maturation*; For whatſoeuer doth ſo alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Maior*: As when *Meat* is Boyled, or Roaſted, or Fried, &c. Or when *Bread* and *Meat* are Baked; Or when *Cheeſe* is made of *Curds*, or *Butter of Creame*, or *Coales* of wood, or *Bricks* of Earth; And a Number of others. But to apply *Notions Philoſophicall* to *Plebeian Termes*; Or to ſay, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme, or Nomenclature* for it; (as the *Ancients* uſed;) They be but *Shifts of Ignorance*; For *Knowledge* will be euer a *Wandering and Indigeſted Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from ſufficient Number of *Instances*, and thoſe well collated,

Experiment
Solitary, tou-
ching *Alterati-*
ons; which may
be called
Maiors.

839

The *Conſiſtences* of *Bodies* are very diuers: *Denſe, Rare; Tan- gible, Pneumaticall; Volatile, Fixed; Determinate, Not Determi- nate, Hard, Soft; Cleauing, Not Cleauing; Congealeable, Not Con- gealeable, Liqueſiable, Not Liqueſiable; Fragile, Tough; Flexible, Inflexible; Tractile, or to be drawen forth in length, Intractile; Porous, Solide; Equall, and Smooth, Vnequall; Venous, and Fi- brous,*

brow, and with *Graines*, *Entire*; And diuers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought*, is a *Compendious* and *Inutile Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparſim* in this in our *Sylua Sylvarum*. Neuertheſſe in ſome good part, We ſhall handle diuers of them now preſently.

Experiment
Solitary tou-
ching Bodies Li-
queſiable, and
not Liueſiable.

840

Liqueſiable, and *Not Liueſiable*, proceed from theſe *Causes*: *Liquefaction* is euer cauſed by the *Detention* of the *Spirits*, which play with- in the *Body*, and *Open* it. Therefore ſuch *Bodies*, as are more *Turgide* of *Spirit*; Or that haue their *Spirits* more *ſtraightly Imprisoned*; Or againe that hold them *Better Pleaſed* and *Content*; are *Liqueſiable*: For theſe three *Diſpoſitions* of *Bodies*, doe arreſt the *Emission* of the *Spirits*. An Ex- ample of the firſt two *Properties* is in *Metalls*; And of the Laſt in *Greafe*, *Pitch*, *Sulphure*, *Butter*, *Wax*, &c. The *Diſpoſition* not to *Liqueſie* proceedeth from the *Eaſie Emission* of the *Spirits*, whereby the *Groſſer Parts* contract; And therefore, *Bodies* *leanne* of *Spirits*; Or which part with their *Spirits* more *Willingly*; are not *Liqueſiable*; As *Wood*, *Clay*, *Free- Stone*, &c. But yet, euen many of thoſe *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Soften*; As *Iron* in the *Forge*; And a *Sticke* bathed in *Hot Aſhes*, which thereby becommeth more *Flexible*. Moreover, there are ſome *Bodies*, which doe *Liqueſie*, or diſſolue by *Fire*; As *Metalls*, *Wax*, &c. And other *Bodies*, which diſſolue in *Water*; As *Salt*, *Sugar*, &c. The *Cauſe* of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The *Cauſe* of the Latter proceedeth from the *Opening* of the *Tangible Parts*, which deſire to receiue the *Liquour*. Again, there are ſome *Bodies*, that diſſolue with both; As *Gumme*, &c. And thoſe be ſuch *Bodies*, as on the One Side haue good ſtore of *Spirit*; And on the other Side, haue the *Tangible Parts* *Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the Latter ſtimulateth the *Parts* to Receiue the *Liquour*.

Experiment
Solitary tou-
ching Bodies
Fragile, and
Tough.

841

Of *Bodies*, ſome are *Fragile*; And ſome are *Tough*, and *Not Fragile*; And in the *Breaking*, ſome *Fragile Bodies* breake but where the *Force* is; Some ſhatter and fly in many *Peeces*. Of *Fragility* the *Cauſe* is an *Impo- tency* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And ſo *Ficſile Earth* is more *Fragile* than *Crude Earth*; And *Dry Wood* than *Greene*. And the *Cauſe* of this *Unaptneſſe* to *Extension*, is the *Small Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is euer *Concomitant* with *Porofity*, and with *Drineſſe* in the *Tangible Parts*: Contrariwiſe, *Tough Bodies* haue more *Spirit*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore wee ſee that *Parchment*, or *Leather* will ſtretch, *Paper* will not; *Woollen Cloth* will tenter, *Linneſ* ſcarcely.

All

All *Solide Bodies* consist of *Parts* of two severall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Nature Spirit* of the *Body*; And in some other, *plaine Aire* that is gotten in; As in *Bodies desiccate*, by *Heat*, or *Age*: For in them, when the *Nature Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are ever the more *Fragile*; For the *Nature Spirit* is more *Yielding*, and *Extensile*, (especially to follow the *Parts*,) than *Aire*. The *Nature Spirits* also admit great *Diversity*; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as wee call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Infinite*, and without any *Extimulation*.

Experiment Solitary, touching the Two Kindes of *Pneumatics* in *Bodies*.

842

The *Concretion* of *Bodies* is (commonly) solued by the *Contrary*; As *Ice*, which is congealed by *Cold*, is dissolued by *Heat*; *Salt* and *Sugar*, which are *Excited* by *Heat*, are *Dissolued* by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returns* to their former *Nature*, than *Alterations*; So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by *Contrary Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either *Meanes*, exhalet little; For the *Cold* keepeth it in; and the *Heat*, (except it be *Vehement*,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Part*, yet as to the *Spirits*, it doth rather make them *Swell*, than *Congeale* them: As when *Ice* is congealed in a *Cup*, the *Ice* will *Swell* in stead of *Contracting*; And sometimes *Rift*.

Experiment Solitary, touching *Concretion*, and *Dissolution* of *Bodies*.

843

Of *Bodies*, some (wee see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Intennesse* of the *Spirits*; And their *Impartie* with the *Tangible Parts*: Both which, if they be in a greater degree, maketh them, not only *Hard*, but *Fragile*, and lesse *Enduring* of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Drie Wood*, &c. *Softnesse* cometh (contrariwise) by the *Greater Quantitie* of *Spirits*; (which ever helpeth to *Induce Yielding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies*, (as wee use the word,) are of two *Kindes*; The one, that easily giueth place to another *Body*, but altereth not *Bulke*, by *Rising* in other *Places*: And therefore wee see that *Wax*, if you put any Thing into it, doth not rise in *Bulke*, but only giueth *Place*: For you may not thinke, that in *Printing* of *Wax*, the *Wax* riseth vp at all; But only the *depressed Part* giueth place, and the other remaineth as it was. The other, that altereth *Bulke* in the *Cession*; As *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they giue place (indeed) easily, but then they rise all over: Which is a *False Cession*; For it is in *Place*, and not in *Body*.

Experiment Solitary, touching *Hard* and *Soft Bodies*.

844

All

Experiment
Solitary tou-
ching Bodies
Dile, and
Tensile.

845

All Bodies *Ductile*, and *Tensile*, (as *Metals* that will be drawne into *Wires*; *Wooll* and *Towe* that will be drawne into *Yarne*, or *Thred*;) have in them the *Appetite* of *Not Discontinuing*, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not to *Discontinue* or forsake their owne Body. *Viscous Bodies*, (likewise,) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese* *toasted*, will draw forth, and roape. But the difference betweene *Bodies Fibrous*, and *Bodies Viscous*, is *Plaine*; For all *Wooll*, and *Towe*, and *Cotton*, and *Silke*, (especially raw *Silke*;) have, besides their Desire of *Continuance*, in regard of the *Tennitie* of their *Thred*, a *Greedinesse* of *Moisture*; And by *Moisture* to ioyne and incorporate with other *Thred*; Especially if there be a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the *Practise* of *Twirling* about of *Spindles*. And wee see also, that *Gold* and *Siluer Thred* cannot be made without *Twisting*.

Experiment
Solitary, tou-
ching other
Passions of
Matter, and
Characters of
Bodies.

846

The Differences of *Impressible* and *Not Impressible*; *Figurable* and *Not Figurable*; *Mouldable* and *Not Mouldable*; *Scissile* and *Not Scissile*; And many other *Passions* of *Matter*, are *Plebeian Notions*, applied vnto the *Instruments* and *Vses* which Men ordinarily practise; But they are all but the *Effects* of some of these *Causes* following; Which we will Enumerate without Applying them, because that would be too long. The First is the *Cession*, or *Not Cession* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the *Outward Bulke*, and not flying vp. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continuitie*, and to flie *Discontinuitie*. The Third is the *Disposition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantitie*, or *Great Quantitie*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it be *Native Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Native Spirits* in the *Body*, whether they be *Active* and *Eager*, or *Dull* and *Gentle*. The Seuen is the *Emission* or *Detention* of the *Spirits* in *Bodies*. The Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Vnequall*; And againe, whether the *Spirits* be *Coacernate*, or *Diffused*. The Tenth is the *Densitie*, or *Raritie* of the *Tangible Parts*. The Eleuenth is the *Equalitie* or *Inequalitie* of the *Tangible Parts*. The Twelfth is the *Disgestion*, or *Cruditie* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous* or *Mercuriall*, *Watric* or *Oylie*, *Drie* and *Terrestriall*, or *Moist* and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, seeme to be *Natures Radicall*, and *Principiall*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length*, or *Transuerse*; (As it is in the *Warpe*, and the *Woofe*, of *Textiles*;) *More Inward*, or *More Outward*; &c. The Fifteenth is the *Porositie*, or *Imporositie* betwixt the *Tangible Parts*; And the *Greatnesse*, or *Smallnesse* of the *Pores*. The Sixteenth is the *Collocation* and *Posture* of the *Pores*. There may be more *Causes*; but these doe occurre for the Present.

Take

Take *Lead*, and melt it, and in the Middest of it, when it beginneth to Congeale, make a little Dint, or Hole, and put *Quicke-Siluer* wrapped in a Peece of *Linnen* into that Hole, and the *Quicke-Siluer* will fix, and run no more, and endure the Hammer. This is a Noble Instance of *Induration*, by Consent of one Body with another, and Motion of Excitation to Imitate; For to ascribe it only to the Vapour of *Lead*, is lesse Probable. Quere whether the Fixing may be in such a degree, as it will be Figured like other Metals? For if so, you may make Works of it for some purposes, so they come not neere the Fire.

Experiment
Solitary, touching
Induration by sympathy.

847

Sugar hath put downe the vse of *Honey*; Insomuch as wee haue lost those *Observations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the Teare or Bloud issuing from the Tree: Insomuch as one of the *Ancients* relateth, that in *Trebiſond*, there was *Honey* issuing from the *Box-Trees*, which made Men Mad. Again, in Ancient time, there was a Kinde of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*; And was not so Lushious as Ours. They had also a *Wine* of *Honey*, which they made thus. They crushed the *Honey* into a great Quantitie of *Water*, and then strained the *Liquour*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Vessels*, for a small time; And after runned it into *Vessels* of *Wood*, and kept it for many yeares. They haue also, at this day, in *Russia*, and those *Northerne Countries*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drinke*, and very Cleare. They vse also in *Wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that wee haue lost in *Honey*, there were brought in vse a *Sugar-Mead*, (for so wee may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keepe it stale, as they vse *Mead*; For certainly, though it would not be so *Abstersiue*, and *Opening*, and *Solutiue* a *Drinke* as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitive*, and fit to be vsed in *Sharpe Diseases*: For wee see, that the vse of *Sugar* in *Beere*, and *Ale*, hath good Effects in such Cases.

Experiment
Solitary touching
Honey and *Sugar*.

848

It is reported by the *Ancients*, that there was a Kinde of *Steele*, in some places, which would polish almost as white and bright as *Silver*. And that there was in *India* a Kinde of *Brasse*, which (being polished) could scarce be discerned from *Gold*. This was in the *Naturall Vre*; But I am doubtfull, whether Men haue sufficiently refined Metals, which we count *Base*; As whether *Iron*, *Brasse*, and *Tinne*, be refined to the Heighth? But when they come to such a Finenesse, as serueth the ordinary vse, they trie no further.

Experiment
Solitary, touching the Finer
Sort of *Base*
Metals.

849

There haue beene found certaine *Cements* vnder *Earth*, that are very Soft; And yet, taken forth into the *Sunne*, harden as Hard as *Marble*:

Experiment
Solitary touching
Cements and *Quarries*.

There

850

There are also ordinary *Quarries* in *Sommerſet-Shire*, which in the *Quarry* cut ſoft to any *Bigneſſe*, and in the *Building* proue firme, and hard.

Experiment
Solitary, touching the
Altering of the Colour of
Haires and Feathers.

851

Living Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray*, and *White*: As is ſcene in *Men*, though ſome Earlier, ſome Later; In *Horſes*, that are Dappled, and turne *White*; In *Old Squirrels*, that turne *Grifly*; And many Others. So doe ſome *Birds*; As *Cygnets*, from *Gray* turne *White*; *Hawkes*, from *Browne* turne more *White*: And ſome *Birds* there be, that vpon their *Moulting*, doe turne *Colour*; As *Robin-Redbreſts*, after their *Moulting*, grow to be *Red* againe, by degrees; So doe *Gold-Finches* vpon the *Head*. The *Cauſe* is, for that *Moifture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drienneſſe* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and ſo all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the moſt part,) wax *Hoare* later. Out of this Ground, a *Man* may deuife the *Meanes* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this ſee the fifth *Experiment*.

Experiment
Solitary, touching the
Differences of Living
Creatures, Male & Female.

852

The *Difference* betweene *Male* and *Female*, in ſome *Creatures*, is not to be diſcerned, otherwiſe than in the *Parts* of *Generation*: As in *Horſes* and *Mares*, *Dogs* and *Bitches*, *Dones* *He* and *She*, and others. But ſome differ in *Magnitude*, and that diuerſly; For in moſt the *Male* is the greater; As in *Man*, *Pheasants*, *Peacocks*, *Turkey's*; and the like: And in ſome few, as in *Hawkes*, the *Female*. Some differ in the *Haire*, and *Feathers*, both in the *Quantitie*, *Criſpation*, and *Colours* of them; As *He-Lions* are *Hirſute*, and haue great *Maines*; The *She's* are ſmooth like *Cats*. *Bulls* are more *Criſpe* vpon the *Fore-head* than *Cowes*; The *Peacocke*, and *Pheasant-Cocke*, and *Gold-Finch-Cocke*, haue glorious and fine *Colours*; The *Henn's* haue not. Generally, the *Hees* in *Birds* haue the faireſt *Feathers*. Some differ in diuers *Features*; As *Bucks* haue *Hornes*, *Doe's* none; *Rammes* haue more wreathed *Hornes* than *Ewes*; *Cocks* haue great *Combes* and *Spurres*, *Henns* little or none; *Boares* haue great *Fangs*, *Sowes* much leſſe; The *Turkey-Cocke* hath great and Swelling *Gills*, the *Hen* hath leſſe; *Men* haue generally *Deeper* and *Stronger Voices* than *Women*. Some differ in *Facultie*; As the *Cocks* amongst *Singing Birds*, are the beſt *Singers*. The *Chiefe Cauſe* of all theſe, (no doubt,) is, for that the *Males* haue more *Strength* of *Heat* than the *Females*; Which appeareth manifeſtly in this, that all young *Creatures* *Males*, are like *Females*; And ſo are *Eunuchs*, and *Gels* *Creatures* of all kinds, liker *Females*. Now *Heat* cauſeth *Greatneſſe* of *Growth*, generally, where there is *Moifture* enough to worke vpon: But if there be found in any *Creature*, (which is ſcene rarely,) an *Ouer-great Heat* in proportion to the *Moifture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moifture*, then there is no *Difference* to be ſcene betweene *Male* and *Female*:

male: As in the *Instances* of *Horses*, and *Dogs*. Wee see also, that the *Hornes* of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* causeth *Pilosity*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which Want of *Heat* cannot Expell: And that is the Cause of the *Beauty* and *Variety* of *Feathers*: Againe, *Heat* doth put forth many *Excreescences*, and much Solide *Matter*, which Want of *Heat* cannot do: And this is the Cause of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combes* and *Spurres* of *Cocks*, *Gills* of *Turky-Cocks*, and *Fangs* of *Boares*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepnesse* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that causeth the *Cock-Singing Bird*, to Excell the *Hen*.

There be *Fishes* greater than any *Beasts*; As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*. For *Fishes*, the Cause may be, that because they Liue not in the *Aire*, they haue not their *Moisture* drawne and Soaked by the *Aire*, and *Sun-Beames*. Also they rest alwaies, in a manner, and are supported by the *Water*; whereas *Motion* and *Labour* doe consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused, for that *Beasts* stay Longer time in the *Wombe*, than *Birds*, and there Nourish, and Grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female*: For the *Sitting* doth *Vinifie*, and not Nourish.

Experiment Solitary, touching the Comparative Magnitude of Living Creatures.

853

We haue partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this we adde further, that the Cause must be *Abundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Dry Sap*: And we see that it is possible, to make a *Tree* put forth onely in *Blossome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more into *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted vpon a *Colewort-Stalke*, sendeth forth a great *Apple* without a *Coare*. It is not vnlikely, that if the *Inward Pith* of a *Tree*, were taken out, so that the Iuyce came onely by the *Barke*, it would worke the *Effect*. For it hath beene obserued, that in *Pollards*, if the *Water* get in on the *Top*, and they become Hollow, they put forth the more. We adde also, that it is deliuered for certaine by some, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* haue little or no *Coares*, and *Stones*.

Experiment Solitary, touching Exossation of Fruits.

854

Tobacco is a thing of great Price, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwise, is great, but nothing to the Profit. But the *English Tobacco*, hath small credit, as being too *Dull*, and *Earthy*: Nay the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the same Cause: So that

Experiment Solitary, touching the Melioration of Tobacco.

855

a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some haue gone about to doe it by Drenching the *English Tobacco*, in a *Decoction* or *Infusion* of *Indian Tobacco*: But those are but Sophistications, and Toyes; For Nothing that is once Perfect, and hath run his Race, can receiue much Amendment. You must euer resort to the Beginnings of Things for *Melioration*. The Way of *Maturation* of *Tobacco* must, as in other *Plants*, be, from the *Heat*, Either of the *Earth*, or of the *Sunne*: We see some Leading of this in Musk-Melons; which are sown vpon a *Hot Bed*, Dunged below, vpon a Bancke turned vpon the *South Sunne*, to giue *Heat* by *Reflexion*; Laid vpon *Tiles*, which increaseth the *Heat*; And Couered with *Straw* to keepe them from *Cold*. They remoue them also, which addeth some *Life*: And by these Helpes they become as good in *England*, as in *Italy*, or *Pronence*. These, and the like Meanes, may be tried in *Tobacco*. Enquire also of the *Steeping* of the *Roots*, in some such *Liquour*, as may giue them Vigour to put forth Strong.

Experiment
Solitary tou-
ching severall
Heats, working
the same Ef-
fects.

856

Heat of the *Sunne*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vinification* of *Lining Creatures*; are both represented and supplied, by the *Heat* of *Fire*; And likewise, the *Heats* of the *Sunne*, and *Life*, are represented one by the other. *Trees*, set vpon the *Backes* of *Chimneyes*, doe ripen *Fruit* sooner. *Vines*, that haue beene drawne in at the *Window* of a *Kitchen*, haue sent forth *Grapes* ripe a Month (at least) before others. *Stoues*, at the Backe of *Walls*, bring forth *Orenges* here with vs. *Egges*, as is reported by some, haue beene hatched in the warmth of an *Ouen*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egs* vnder *Sand*, where the *Heat* of the *Sunne* discloseth them.

Experiment
Solitary, tou-
ching Swelling
and Dilatation
in Boiling.

857

Barley in the *Boiling* swelleth not much; *Wheat* swelleth more; *Rize* extremely; In so much as a *Quarter* of a *Pint* (vnboyled) will arise to a *Pint* boyled. The *Cause* (no doubt) is, for that the more *Close* and *Compact* the *Body* is, the more it will dilate: Now *Barley* is the most *Hollow*; *Wheat* more *Solide* than that; and *Rize* most *Solide* of all. It may be also that some *Bodies* haue a *Kinde* of *Lentour*, and more *Depertible Nature* than others; As we see it Euident in *Colouration*; For a Small *Quantity* of *Saffron*, will *Tinct* more, than a very great *Quantity* of *Bresill*, or *Wine*.

Experiment
Solitary, tou-
ching the Dul-
coration of
Fruits.

858

Fruit groweth *Sweet* by *Rowling*, or *Pressing* them gently with the *Hand*; As *Rowling-Peares*, *Damasins*, &c. By *Rottenesse*; As *Medlars*, *Sernices*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine *Speciall Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roasting*, *Stewing*, *Baking*, &c. The *Cause* of the *Sweetnesse* by *Rowling*, and *Pressing*, is *Emollition*, which they properly enduce; As in *Beating* of *Stock-Fish*, *Flesh*, &c. By *Rottenesse* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby digest the

the Harder Part: For in all *Putrefactions*, there is a *Degree* of *Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe euer feed vpon the *Tangible Parts*, and attenuate them. By *Seuerall Maturations* is, by some *Degree* of *Heat*. And by *Fire* is, because it is the Proper Worke of *Heat* to Refine, and to Incorporate; And all *Sourenesse* consisteth in some *Grossenesse* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which euer induceth a *Milder Taste*.

Of *Fleshes*, some are *Edible*; Some, except it be in *Famine*, not. For those that are not *Edible*, the *Cause* is, for that they haue (commonly) too much *Bitternesse* of *Taste*; And therefore those *Creatures*, which are Fierce and Cholerick, are not *Edible*; As *Lions*, *Wolues*, *Squirrells*, *Dogs*, *Foxes*, *Horses*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We see they are *Milde*, and *Faarefull*. Yet it is true, that *Horses*, which are *Beasts* of *Courage*, haue beene, and are eaten by some *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineses* eat *Horse-flesh* at this day; And some *Gluttons* haue vsed to haue *Colts-flesh* baked. In *Birds*, such as are *Carniuora*, and *Birds* of *Prey*, are commonly no *Good Meat*; But the Reason is, rather the *Cholerick Nature* of those *Birds*, than their *Feeding* vpon *Flesh*; For *Puits*, *Gulls*, *Shouelers*, *Duckes*, doe feed vpon *Flesh*, and yet are *Good Meat*: And wee see, that those *Birds*, which are of *Prey*, or feed vpon *Flesh*, are good *Meat*, when they are very Young; As *Hawkes*, *Rookes* out of the Nest, *Owles*, &c. *Mans Flesh* is not Eaten. The Reasons are Three: First, because *Men* in *Humani-ty* doe abhorre it: Secondly, because no *Living Creature*, that *Dyeth* of *it selfe*, is good to Eat: And therefore the *Caniballs* (themselves) eat no *Mans-flesh*, of those that *Dye* of *Themselves*, but of such as are *Slaine*. The Third is, because there must be (generally) some *Disparity*, between the *Nourishment*, and the *Body Nourished*; And they must not be Ouer-neere, or like: Yet we see, that in great *Weaknesses*, and *Consumptions*, *Men* haue beene sustained with *Womans Milke*: And *Ficinus* fondly (as I conceiue) aduise, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *Witches* doe greedily eat *Mans flesh*; which if it be true, besides a *Diuellish Appetite* in them, it is likely to proceed, for that *Mans flesh* may send vp High and Pleasing *Vapours*, which may stirre the *Imagination*; And *Witches* Felicity is chiefly in *Imagination*, as hath beene said.

There is an Ancient Receiued *Tradition* of the *Salamander*, that it liueth in the *Fire*, and hath force also to extinguish the *Fire*. It must haue two Things, if it be true, to this *Operation*: The One a very *Close Skin*, whereby *Flame*, which in the Midst is not so hot, cannot enter: For we see that if the *Palme* of the *Hand* be annointed thicke with *White* of *EGGE*, and then *Aquauiua* be poured vpon it, and Enflamed, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and

Experiment
Solitary, tou-
ching *Flesh* E-
dible, and not
Edible.

859

Experiment
Solitary, tou-
ching the *Sala-
mander*.

860

Quenching vertue, in the *Body* of that *Creature*, which choaketh the *Fire*. We see that *Milke* quencheth *Wilde-Fire*, better than *Water*, because it entreth better.

Experiment
Solitary, touch-
ing the Con-
trary Operations
of Time, vpon
Fruits, and Li-
quours.

861

Time doth change *Fruit*, (as *Apples*, *Pearces*, *Pomgranats*, &c.) from more *Soure*, to more *Sweet*: But contrariwise *Liquours*, (euen those that are of the *Iuyce* of *Fruit*,) from more *Sweet* to more *Soure*; As *Wort*, *Must*, *New Veriuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both *Kindes*, the *Spirit* is attenuated by *Time*; But in the first *Kinde*, it is more *Diffused*, and more *Mastered* by the *Grosser Parts*, which the *Spirits* doe but digest: But in *Drinkes* the *Spirits* doe raigne, and finding lesse *Opposition* of the *Parts*, become themselves more *Strong*; Which causeth also more *Strength* in the *Liquour*; Such, as if the *Spirits* be of the *Hotter Sort*, the *Liquour* becommeth apt to *Burne*; But in *Time*, it causeth likewise, when the *Higher Spirits* are *Euapourated*, more *Sourness*.

Experiment
Solitary touch-
ing *Blowes*
and *Bruises*.

862

It hath beene obserued by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath onely a *Virtual Cold*, which doth not search into the *Hurt*; Whereas all *Plasters*, and *Ointments* doe enter. Surely, the *Cause*, that *Blowes* and *Bruises* enduce *Swellings*, is, for that the *Spirits* resorting to *Succour* the *Part* that *Laboureth*, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gonns*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment
Solitary, touch-
ing the *Orris*
Root.

863

The *Nature* of the *Orris Root*, is almost *Singular*; For there be few *Odoriferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to haue a *Tender dainty Heat*; Which when it commeth aboue *Ground*, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a *Smell* like a *Violet*.

Experiment
Solitary touch-
ing the Com-
pression of Li-
quours.

864

It hath beene obserued by the *Ancients*, that a great *Vessell* full, drawne into *Bottles*; And then the *Liquour* put againe into the *Vessell*; will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquour*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may be *Triuiall*; Namely, by the *Expence* of the *Liquour*, in regard some may sticke to the *Sides* of the *Bottles*: But there may be a *Cause* more *Subtill*; Which is, that the *Liquour* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquour* meeteth with *Liquour* chiefly; But in the *Bottles* a *Small Quantity* of *Liquour*, mee-
teth

teth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open againe.

Water, being contiguous with *Aire*, Cooleth it, but Moisteneth it not, except it *Vapour*. The Cause is, for that *Heat*, and *Cold* haue a *Virtuall Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such seuerall Leuity, and Grauity, as they Mingle not, there can follow no *Imbibition*. And therefore, *Oyle* likewise lyeth at the Top of the *Water*, without Commixture: And a *Drop* of *Water*, running swiftly ouer a *Straw*, or *Smooth Body*, wetteth not.

Experiment
Solitary, touch-
ing the Work-
ing of *Water*
vpon *Aire* Con-
tiguous.

865

Starre-light Nights, yea and bright *Moone-shine Nights*, are Colder than *Cloudy Nights*. The Cause is, the *Driness* and *Fineness* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is dry. Also *Close Aire* is warmer than *Open Aire*; which (it may be) is, for that the true Cause of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And againe, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some Secret Degree of *Heat*: As it is not likewise without some Secret Degree of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

Experiment
Solitary, touch-
ing the Na-
ture of *Aire*.

866

The *Eyes* doe moue one and the same way; For when one *Eye* moueth to the *Nostrill*, the other moueth from the *Nostrill*. The Cause is *Motion of Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Vse* will induce the Contrary: For some can *Squint*, when they will: And the Common *Tradition* is, that if *Children* be let vpon a Table, with a *Candle* behinde them, both *Eyes* will moue Outwards; As affecting to see the *Light*, and so induce *Squinting*.

Experiments
in Consort,
touching the
Eyes, and *Sight*.

867

We see more exquisitely with *One Eye Shut*, than with *Both Open*. The Cause is, for that the *Spirits Visuall* vnite themselues more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth.

868

The *Eyes*, if the *Sight* meet not in one *Angle*, See Things Double. The Cause is, for that Seeing two Things, and Seeing one Thing twice, worketh the same Effect: And therefore a little *Pellet*, held betweene two *Fingers*, laid a-crosse, seemeth Double.

869

Pore-blinde Men, see best in the *Dimmer Lights*; And likewise haue their *Sight* Stronger neare hand, than those that are not *Pore-blinde*; And can Reade and Write smaller *Letters*. The Cause is, for that the *Spirits Visuall*, in those that are *Pore-blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* disperseth them. For the same

870

Cause

Cause they need Contracting; But being *Contracted*, are more strong, than the *Visuall Spirits* of Ordinary *Eyes* are; As when we see thorow a *Lenell*, the *Sight* is the Stronger: And so is it, when yon gather the *Eye-lids* somewhat close: And it is commonly seene in those that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to Reade, put the Paper somewhat a farre off. The Cause is, for that *Old Mens Spirits Visuall*, contrary to those of *Pore-blinde Men*, vnite not, but when the *Obiect* is at some good distance, from their *Eyes*.

871

Men see better, when their *Eyes* are ouer-against the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The Reason is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfused* is enough for the *Perception*. For we see, that an *Over-light* maketh the *Eyes* Dazell; Insomuch as Perpetuall Looking against the *Sunne*, would Cause *Blindnesse*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwise, if they come out of a *Darke Roome*, into a *Light Roome*, they seeme to haue a *Mist* before their *Eyes*, and see worse, than they shall doe, after they haue stayed a little while, either in the *Light*, or in the *Darke*. The Cause is, for that the *Spirits Visuall*, are vpon a Sudden Change, disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot *Contract* suddenly; And when they are much *Contracted* by *Darknesse*, they cannot *Dilate* suddenly. And Excesse of both these, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*,) if it be long, Destroyeth the *Eye*. For as long Looking against the *Sunne*, or *Fire*, hurteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872

It hath beene obserued, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The Cause is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seene in the *Eyes*, because they are Translucide; Though withall it maketh both the *Cheekes*, and the *Gills* *Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*, for that the *Eyes*, in Shame doe put backe the *Spirits*, that ascend to them, as vnwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Deiectedly; And that *Repulsion* from the *Eyes*, Diuerteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873

The *Obiects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*, Except it be by *Memory*, as hath beene said. The *Glimpes* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that haue glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautifull Person*; And the like; doe delight and exhilarate the *Spirits* much. The Reason,

Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is the most *Spiritual* of the *Senses*; whereby it hath no *Object* Groffe enough to offend it. But the *Cause* (chiefly) is, for that there be no *Active Objects* to offend the *Eye*. For *Harmonical Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smells*, and *Stinks*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Ouer-Hot*, and *Ouer-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore haue little or no *Actiuitie*. Somewhat they doe *Contristate*, but very little.

Water of the *Sea*, or otherwise, looketh *Black*er when it is moued, and *Whiter* when it resteth. The *Cause* is, for that by meanes of the *Motion*, the *Beames* of light passe not *Straight*, and therefore must be darkened; whereas, when it resteth, the *Beames* doe passe *Straight*. Besides, *Splendour* hath a *Degree* of *Whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh *Whiter*, than *Glasse Simple*. This *Experiment* deserueth to be driuen further, in *Trying* by what *Meanes Motion* may hinder *Sight*.

Experiment
Solitary, touching the Colour
of the Sea, or
other Water.

874

Shell-Fish haue beene, by some of the *Ancients*, compared and sorted with the *Insects*; But I see no reason why they should; For they haue *Male*, and *Female*, as other *Fish* haue: Neither are they bred of *Putrefaction*; Especially such as doe Moue. Neuerthelesse it is certaine, that *Oysters*, and *Cockles*, and *Mussels*, which Moue not, haue no discriminate *Sex*: *Quare* in what time, and how they are bred? It seemeth that *Shells* of *Oysters* are bred where none were before; And it is tried, that the great *Horse-Mussle*, with the fine-shell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is strange, it hath beene tried, that they doe not only *Gape*, and *Shut*, as the *Oysters* doe, but *Remoue* from one *Place* to *Another*.

Experiment
Solitary touching *Shell-Fish*.

875

The *Senses* are alike *Strong*, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are *Stronger*. The *Cause* may be, for that the *Braine*, which is the *Instrument* of *Sense*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Mouing*, are somewhat holpen from the *Litter*, which lieth on the *Right Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides*, from the *Time* of our *Birth*; But the *Limmes* are vsed most on the *Right Side*, whereby *Custom* helpeth; For wee see that some are *Left-Handed*: Which are such, as haue vsed the *Left-Hand* most.

Experiment
Solitary, touching the *Right Side*, and the *Left*.

876

Frictions make the *Parts* more *Fleshie*, and *Full*: As wee see both in *Men*; And in *Currying* of *Horses*, &c. The *Cause* is, for that they draw greater *Quantitie* of *Spirits* and *Bloud* to the *Parts*: And againe, because they draw the *Aliment* more forcibly from within: And againe, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *Bloud*, and *Aliment*: Lastly, because they dissipate and digest any *Inutile* or *Excrementitious*

Experiment
Solitary touching *Frictions*.

877

crementitious Moisture, which lieth in the *Flesh*: All which helpe *Assimilation*. *Frictions* also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The *Cause* is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we haue noted heretofore,) *Gally-Slaues* are *Fat* and *Fleshie*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment
Solitary tou-
ching Globes
appearing Flat
at Distance.

878

All Globes as farre off appeare Flat. The *Cause* is, for that *Distance*, being a *Secondary Object of Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparitie* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Dusky Paper*: And all *Engravings*, and *Embossings*, (as farre off) appeare *Plaine*.

Experiment
Solitary tou-
ching Shadows

879

The *Vtmōst Parts* of *Shadows* seeme euer to *Tremble*. The *Cause* is, for that the little *Moats*, which wee see in the *Sunne*, doe euer *Stirre*, though there be no *Wind*; And therefore those *Mouing*, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to *Moue*, because the *Medium* *Moueth*.

Experiment
Solitary tou-
ching the Row-
ling and Brea-
king of the Seas

880

Shallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantitie* of *Water*, and likewise *Space* Enough; there the *Water* *Rowleth*, and *Moueth*, both more *Slowly*, and with a *Sloper Rise*, and *Fall*: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the *Bottom*; there it *moueth* more *Swiftly*, and more in *Precipice*; For in the *Breaking* of the *Wanes* there is euer a *Precipice*.

Experiment
Solitary tou-
ching the Dul-
curation of Salt
Water.

881

It hath beene obserued by the *Ancients*, that *Salt-Water* *Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it selfe *Raw*: And yet the *Taste* of *Salt*, in *Distillations* by *Fire*, riseth not; For the *Distilled Water* will be *Fresh*. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottom*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For *Simple Distilled Waters*, of *Wormewood*, and the like, are not *Bitter*.

Experiment
Solitary tou-
ching the Re-
turne of Salt-
nesse in Pits vp-
on the Sea-
Shore.

882

It hath beene set downe before, that *Pits* vpon the *Sea-Shore*, turne into *Fresh Water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some *Places* of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The *Cause* is, for that after a time, the very *Sands*, thorow which the *Salt-Water* passeth, become *Salt*; And so the *Strainer* it selfe is tinced with *Salt*.

Salt. The Remedietherefore is, to digge still *New Pits*, when the old wax *Brackish*; As if you would change your *Strainer*.

It hath beene obserued by the *Ancients*, that *Salt Water*, will dissolue *Salt* put into it, in lesse time, than *Fresh Water* will dissolue it. The *Cause* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude of Substance*, draw the *Salt* new put in, vnto it; Whereby it diffuseth in the *Liquour* more speedily. This is a Noble *Experiment*, if it be true; For it sheweth Meanes of more Quicke and Easie *Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude of Substance*. Trie it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water* *Unsugred*.

Experiment
Solitary touching
Attraction by
Similitude
of *Substance*.

883

Put *Sugar* into *Wine*, part of it aboue, part vnder the *Wine*; And you shall finde, (that which may seeme strange,) that the *Sugar* aboue the *Wine*, will soften and dissolue sooner, than that within the *Wine*. The *Cause* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is vnder the *Wine*, by *Simple Infusion*, or *Spreading*; But that *Part* aboue the *Wine*, is likewise forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquour*, if it be *Contiguous*: As wee see it also in *Sponges*, put part aboue the *Water*. It is worthy the *Inquiry*, to see how you may make more *Accurate Infusions*, by Helpe of *Attraction*.

Experiment
Solitary touching
Attraction.

884

Water in *Wells* is warmer in *Winter*, than in *Summer*: And so *Aire* in *Caves*. The *Cause* is, for that in the *Hither Parts*, vnder the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which shut close in, (as in *Winter*,) is the More; But if it *Perspire*, (as it doth in *Summer*,) it is the Lesse.

Experiment
Solitary touching
Heat vnder
Earth.

885

It is reported, that amongst the *Leucadians*, in *Ancient* time, vpon a *Superstition*, they did vse to *Precipitate* a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with *Strings*, at some distance, many great *Fowles*; And fixing vnto his *Body* diuers *Feathers*, spred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare vp a good *Weight*, as they flie; And *Spreading* of *Feathers*, thinne, and close, and in great *Bredth*, will likewise beare vp a great *Weight*; Being euen laid, without *Tilting* vpon the *Sides*. The further *Extension* of this *Experiment* for *Flying* may be thought vpon.

Experiment
Solitary touching
Flying in
the *Aire*.

886

There is, in some *Places*, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarfe-Oake*: Vpon the *Leaves* whereof there riseth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certaine *Red Dust*, that conuerteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to *Quicken*: With this *Dust* they die *Scarlet*.

Experiment
Solitary touching
the *Dye*
of *Scarlet*.

887

In *Zant*, it is very ordinary, to make *Men Impotent*, to accompany
H h with

Experiment
Solitary tou-

ching Malefi-
ciating.

888

Experiment
Solitary, tou-
ching the Rise
of Water, by
Meanes of
Flame.

889

Experiments
in Consort,
touching the
Influences of
the Moone.

with their *Wines*. The like is Practised in *Gasconie*; Where it is called *Nonër Peguilette*. It is practised alwayes vpon the *Wedding Day*. And in *Zant*, the Mothers themselves doe it, by way of Preuention; Because thereby they hinder other *Charmes*, and can vndoe their Owne. It is a Thing the *Ciuill Law* taketh knowledge of; And therefore is of no Light Regard.

It is a Common *Experiment*, but the *Cause* is mistaken. Take a *Pot*, (Or better a *Glasse*, because therein you may see the *Motion*.) And set a *Candle* lighted in the *Bottom* of a *Basen* of *Water*; And turne the *Mouth* of the *Pot*, or *Glasse*, ouer the *Candle*, and it will make the *Water* rise. They ascribe it, to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as soone as it is coue- red, being suffocated by the *Close Aire*, lesseneth by little and little: Du- ring which time, there is some little *Ascent* of *Water*, but not much: For the *Flame* Occupying lesse and lesse *Roome*, as it lesseneth, the *Water* succeedeth. But vpon the *Instant* of the *Candles Going out*, there is a sud- den *Rise*, of a great deale of *Water*; For that the *Body* of the *Flame* filleth no more *Place*; And so the *Aire*, and the *Water* succeed. It worketh the same *Effect*, if in stead of *Water*, you put *Flower*, or *Sand*, into the *Basen*: Which sheweth, that it is not the *Flames* Drawing the *Liquour*, as *Nou- rishment*; As it is supposed; For all *Bodies* are alike vnto it; As it is euer in *Motion* of *Nexe*; Insomuch as I haue scene the *Glasse*, being held by the *Hand*, hath lifted vp the *Basen*, and all: The *Motion* of *Nexe* did so Claspe the *Bottom* of the *Basen*. That *Experiment*, when the *Basen* was lifted vp, was made with *Oyle*, and not with *Water*: Neuerthelesse this is true, that at the very first *Setting* of the *Mouth* of the *Glasse*, vpon the *Bot- tome* of the *Basen*, it draweth vp the *Water* a little, and then standeth at a *Stay*, almost till the *Candles Going out*, as was said. This may shew some *Attraction* at first: But of this we will speake more, when we handle *At- tractions* by *Heat*.

Of the *Power* of the *Celestiall Bodies*, and what more Se- cret *Influences* they haue, besides the two Manifest *Influences* of *Heat*, and *Light*, We shall speake, when we handle *Experi- ments* touching the *Celestiall Bodies*: Meane-while, wee will giue some *Directions* for more certaine *Trials*, of the *Vertue* and *Influences* of the *Moone*; which is our *Nearest Neigh- bour*.

The *Influences* of the *Moone*, (most obserued,) are *Foure*. The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: The *Increase* of *Moisture*: The *Exciting* of the *Motions* of *Spirits*.

For

890

For the *Drawing forth* of Heat, we haue formerly prescribed, to take *Water Warne*, and to set Part of it against the *Moone-Beames*, and Part of it with a *Skreene* betweene; And to see whether that which standeth Exposed to the *Beames*, will not *Cool* sooner. But because this is but a *Small Interposition*, (though in the *Sunne* wee see a *Small Shade* doth much,) it were good to try it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water Warne* in a *Glassee-Bottle*, as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c.

891

For the *Inducing* of *Putrefaction*, it were good to try it with *Flesh*, or *Fish*, Exposed to the *Moone-Beames*; And againe Exposed to the *Aire*, when the *Moone* shineth not, for the like time; To see whether will corrupt sooner: And try it also with *Capon*, or some other *Fowle*, laid abroad, to see whether it will mortifie, and become tender sooner? Try it also with *Dead Flies*, or *Dead Wormes*, hauing a little *Water* cast vpon them, to see whether will *Putrifie* sooner. Try it also with an *Apple*, or *Orange*, hauing *Holes* made in their *Tops*, to see whether will Rot or Mould sooner? Try it also with *Holland-Cheese*, hauing *Wine* put into it, whether will breed *Mites* sooner, or greater?

892

For the *Increase* of *Moisture*, the Opinion Receiued is; That *Seeds* will grow soonest; And *Haire*, and *Nailles*, and *Hedges*, and *Herbs*, Cut, &c. will grow soonest, if they be Set, or Cut, in the *Increase* of the *Moone*. Also that *Braines* in *Rabits*, *Wood-cocks*, *Calues*, &c. are fullest in the *Full* of the *Moone*: And so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you haue them in *Pits*.

893

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) and set some of them immediately after the *Change*; And others of the same kinde immediately after the *Full*: Let them be as Like as can be: The *Earth* also the Same as neare as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the *Difference* of the *Weather* confound the *Experiment*: And then see in what Time, the *Seeds* Set in the *Increase* of the *Moone*, come to a certaine Height; And how they differ from those that are Set in the *Decrease* of the *Moone*.

894

It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, vpon the *Full* of the *Moone*: And therefore it were good for those that haue *Moist Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloës*, *Rose-Mary*, *Frankincense*, &c. about the full of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moone* doth; And therefore it were good to Purge, some day, or two, after the *Full*; For that then the *Humours* will not replenish so soone againe.

895

As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbes*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*.

896

There may be other *Secret Effects* of the *Influence* of the *Moone*, which are not yet brought into *Observation*. It may be, that if it so fall

out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South-West*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be obserued.

897

It may be, that *Children*, and *Young Castell*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, & larger, than those that are brought forth in the *Wane*: And those also which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandry*, to put *Rams*, and *Bulls* to their *Females*, somewhat before the *Full* of the *Moone*. It may be also, that the *Egs* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Observation*: *Quare* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*?

Experiment
Solitary tou-
ching *Vinegar*.

898

The *Turning* of *Wine* to *Vinegar*, is a *Kinde* of *Putrefaction*: And in *Making* of *Vinegar*, they vse to set *Vessels* of *Wine* ouer against the *Noone-Sunne*; which calleth out the more *Oily Spirits*, and leaueth the *Liquour* more *Soure*, and *Hard*. We see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said, that *Cider* in *Navigations* vnder the *Line* ripeneth, when *Wine* or *Beere* soureth. It were good to set a *Rundlet* of *Verinyce* ouer against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will *Ripen*, and *Sweeten*.

Experiment
Solitary, tou-
ching *Creatures*
that sleepe all
Winter.

899

There be diuers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hog*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *Want* of *Assimilating*; For whatsoeuer *Assimilates* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping Time*, haue been obserued not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remoue*. And they get *Warme* and *Close Places* to *Sleepe* in. When the *Flemmings* Wintred in *Noua Zembla*, the *Bears*, about the *Middle* of *November*, went to *Sleepe*; And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Bear* breedeth, and lyeth in with her *Young*, during that time of *Rest*: And that a *Beare*, *Big* with *Young*, hath seldome beene scene.

Experiment
Solitary tou-
ching the Gene-
rating of *Crea-
tures* by *Copula-
tion*, and by *Put-
refaction*.

900

Some *Living Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (neuerthelesse) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Viuification*, is a *Gentle* and *Proportionable Heat*, working vpon a *Glutinous* and *Teelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Teelding*, is driuen forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*.

There-

Therefore all *Sperme*, all *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, haue euermore a *Clofenesse*, *Lentour*, and *Sequacity*. It seemeth therefore, that the *Generation* by *Sperme onely*, and by *Putrefaction*, haue two Different *Causes*. The First is, for that *Creatures*, which haue a *Definite* and *Exact Shape*, (as those haue which are Procreated by *Copulation*,) cannot be produced by a *Weake*, and *Casual Heat*; Nor out of *Matter*, which is not *exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vinification* be of any length, then the *Spirit* will *Exhale*, before the *Creature* be *Mature*: Except it be *Enclosed* in a *Place* where it may haue *Continuance* of the *Heat*, *Accesse* of some *Nourishment* to maintaine it, and *Clofenesse* that may keepe it from *Exhaling*. And such *Places* are the *Wombes*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Vncertaine Shape*; And are made in *Shorter Time*; And need not so *Perfect* an *Enclosure*, though some *Clofenesse* be commonly required. As for the *Heathen Opinion*, which was, that vpon great *Mutations* of the *World*, *Perfect Creatures* were first Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and such like, are now; Wee know it to be vaine: But if any such Thing should be admitted, Discoursing according to *Sense*, it cannot be, except you admit a *Chaos* first, & *Commixture* of *Heaven*, and *Earth*. For the *Frame* of the *World*, once in Order, cannot effect it by any *Excesse*, or *Casualtie*.

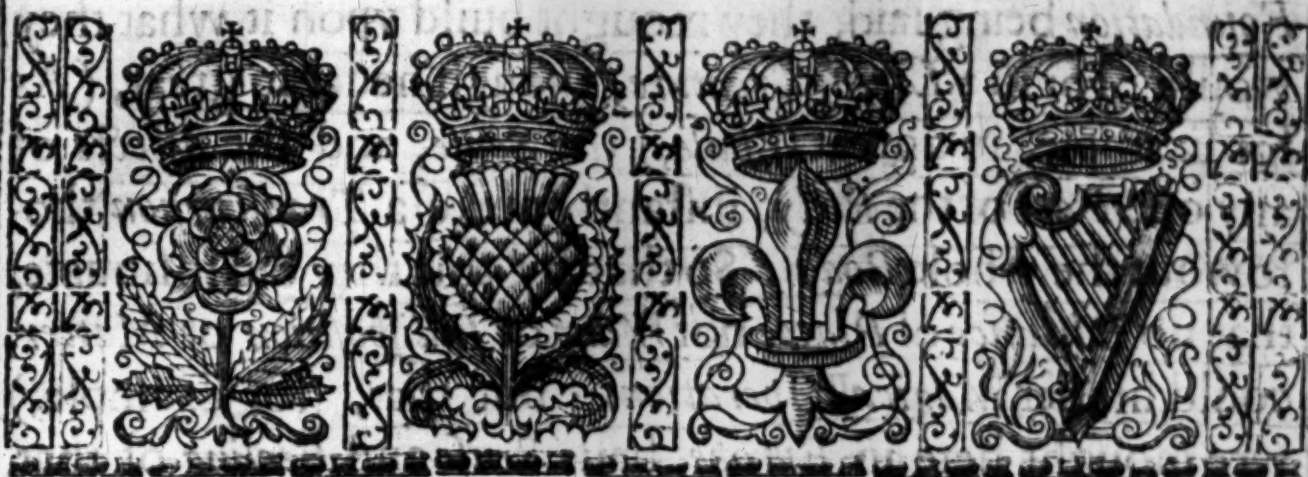
NATV-

Therefore all these, all manifestly shewing, that the creature
is not produced by necessity, but by choice, and is not
and separate. It is not therefore that the creature is
and by necessity, but by choice. The First is, for that
creature, which has a definite form, as the human which
is produced by necessity, cannot be produced by a black, and a
white, nor out of water, which is not exactly produced, according
to the system. The Second is, for that there is a greater time required
for the formation of perfect creatures, than for the formation of imperfect
ones, as the growth of the body will exhibit, before the creature
nature: because it is not possible, in a place where it may have
of the body, which is of some necessity to maintain it, and therefore
it may keep it from exhibiting. And in such places are the human, and
the animal, and the vegetable. And therefore all creatures, made of parts
of the body, are not perfect in shape; and are made in three times. And
therefore perfect in shape, though some creatures be commonly
produced. As the human creature, which was that very great state
of the body, perfect creatures were first produced of the
earth; as well as frogs, and lizards, and such like
creatures. We know it to be true; but any such
thing should be admitted, Discontinuing
thing to take it cannot be, except you ad-
mit that it is not a creature, but of the
earth, and earth. For the name of
the human creature is in order, and
not in any other.

case, or case.

allies.

NATV



NATVRALL HISTORIE.

X. Century.



THe *Philosophie* of *Pythagoras*, (which was full of *Superstition*,) did first plant a *Monstrous Imagination*, Which afterwards was, by the *Schoole* of *Plato*, and Others, Watred, and Nourished. It was, that the *World* was *One, Entire, Perfect, Liuing Creature*; Insomuch as *Apollonius* of *Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing and Flowing* of the *Sea*, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Liuing Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deitie* besides;) But only

Experiments
in Consort
touching the
Transmission,
and *Influx*, of
Immaterial
Vertues, and the
Force of *Imagi-*
nation.

Experiments
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Transmission,
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Force of *Imagi-*
nation.

only the Soule, or Essentiall Forme of the Vniuerse. This Foundation being laid, they mought build vpon it, what they would; For in a *Living Creature*, though neuer so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of any one Part of the Body, instantly make a *Transcursion* thoroughout the whole Body: So that by this they did insinuate, that no *Distance of Place*, nor *Want or Indisposition of Matter*, could hinder *Magicall Operations*; But that, (for Example,) wee mought here in *Europe*, haue *Sense and Feeling* of that, which was done in *China*: And likewise, we mought worke any *Effect*, without, and against *Matter*: And this, not Holpen by the *Cooperation of Angels, or Spirits*, but only by the *Vnitate and Harmonie of Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit of Man*, (whom they call the *Microcosme*,) doe giue a fit touch to the *Spirit of the World*, by strong *Imaginations*, and *Beleeves*, it might command *Nature*; For *Paracelsus*, and some darksome *Authors of Magicke*, doe ascribe to *Imagination Exalted*, the *Power of Miracle-working Faith*. With these Vast and Bottomelesse *Follies*, Men haue been (in part) entertained.

But wee, that hold firme to the *Works of God*; And to the *Sense*, which is *Gods Lampe*; (*Lucerna Dei Spiraculum Hominis*;) willen quire, with all *Sobrietie*, and *Sinceritie*, whether there be to be found, in the *Foot-steps of Nature*, any such *Transmission and Influx of Immaterial Vertues*; And what the *Force of Imagination* is; Either vpon the *Body Imaginant*, or vpon another *Body*: Wherein it will be like that *Labour of Hercules*, in *Purging the Stable of Augeas*, to separate from *Superstitious*, and *Magicall Arts*, and *Observations*, any thing that is cleane, and pure *Naturall*; And not to be either *Contemned*, or *Condemned*. And although wee shall haue occasion to *Speake of this* in more *Places than One*, yet we will now make some *Entrance* thereinto.

Men are to be *Admonished*, that they doe not with-draw *Credit*, from the *Operations by Transmission of Spirits*, and *Force of Imagination*, because the *Effects faile sometimes*. For as in *Infection*, and *Contagion* from *Body to Body*, (as the *Plague*, and the like,) it is most certaine, that

Experiments
in Consort,
Monitory, tou-
ching Trans-
mission of Spirits,
and the Force
of Imagination.

the *Infection* is receiued (many times) by the *Body Passive*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it be formed into a *Disease*; So much more in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is *Encountred*, and *Overcome*, by the *Minde* and *Spirit*, which is *Passive*, before it worke any manifest *Effect*. And therefore, they worke most vpon *Weake Mindes*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious*, and *Fearfull Persons*; *Children*, and *Young Creatures*;

Nescio quis teneros Oculis mihi fascinat Agnos:

The *Poet* speaketh not of *Sheepe*, but of *Lambs*. As for the *Weaknesse* of the *Power* of them, vpon *Kings*, and *Magistrates*; It may be ascribed, (besides the maine, which is the *Protection* of *God*, ouer those that *Execute* his Place,) to the *Weaknesse* of the *Imagination* of the *Imaginant*: For it is hard, for a *Witch*, or a *Sorcerer*, to put on a *Beleeve*, that they can hurt such *Persons*.

Men are to be *Admonished*, on the other side, that they doe not easily giue Place and *Credit* to these *Operations*, because they *Succeed* many times; For the *Cause* of this *Success*, is (oft) to be truly ascribed, vnto the *Force* of *Affection* and *Imagination*, vpon the *Body Agent*; And then by a *Secondary Meanes*, it may worke vpon a *Diuers Body*: As for Example; If a *Man* carry a *Planets Seale*, or a *Ring*, or some *Part* of a *Beast*, beleeuing strongly, that it will helpe him to obtaine his *Loue*; Or to keepe him from danger of hurt in *Fight*; Or to preuaile in a *Suit*; &c. it may make him more *Active*, and *Industrious*; And againe, more *Confident*, and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industrie*, and *Persuerance*, (especially in *Ciuill Businesse*,) who knoweth not? For wee see *Audacitie* doth almost binde and mate the weaker *Sort* of *Minds*; And the *State* of *Humane Actions* is so variable, that to trie Things oft, and neuer to giue ouer, doth *Wonders*: Therefore, it were a *Meere Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, vpon another *Body*, which is but the *Force* of *Imagination* vpon the *Proper Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly vpon the *Body* of the *Imaginant*: As wee shall shew in due place.

Men are to be *Admonished*, that as they are not to mistake the *Causes* of these *Operations*; So, much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as diuers wise *Iudges* haue prescribed, and cautioned, Men may not too rashly beleeue, the *Confessions* of *Witches*, nor yet the *Evidence* against them. For the *Witches* themselves are *Imaginative*, and beleeue oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-Craft*. It is worthy the *Observing*, that both in *Ancient*, and *Late times*; (As in the *Thessalian Witches*, and the *Meetings* of *Witches* that haue beene recorded by so many late *Confessions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselves into

other *Bodies*; &c. are still reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Annointing* themselves all over. This may iustly moue a *Man* to thinke, that these *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke,) by *Stopping* of the *Pores*, shut in the *Vapours*, and send them to the *Head* extremely. And for the Particular *Ingredients* of those *Magickall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annointing* of the *Fore-head*, *Necke*, *Feet*, *Back-Bone*, we know is vsed for *Procuring Dead Sleepes*: And if any *Man* say, that this *Effect* would be better done by *Inward Potions*; Answer may be made, that the *Medicines*, which goe to the *Ointments*, are so strong, that if they were vsed inwards, they would kill those that vse them: And therefore they worke Potently, though Outwards.

We will diuide the Seuerall Kindes of the *Operations*, by *Transmission* of *Spirits*, and *Imagination*; Which will giue no small Light to the *Experiments* that follow. All *Operations* by *Transmission* of *Spirits*, and *Imagination* haue this; That they *Worke at Distance*, and not at *Touch*; And they are these being distinguished.

904

The First is the *Transmission* or *Emission*, of the *Thinner*, and more *Airy Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the rest, the most *Corporeall*. But you must remember withall, that there be a Number of those *Emissions*, both *Wholesome*, and *Unwholesome*, that giue no *Smell* at all: For the *Plague*, many times, when it is taken, giueth no *Scent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other *Proofes*, that differ not in *Smell* from other *Aires*. And vnder this Head, you may place all *Imbibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour-like*; Whereof some neuertheless are strange, and very suddenly diffused; As the *Alteration*, which the *Aire* receiueth in *Egypt*, almost immediately, vpon the *Rising* of the *River* of *Nilus*, whereof we haue spoken.

905

The Second is the *Transmission* or *Emission* of those *Things* that wee call *Spiritual Species*; As *Visibles*, and *Sounds*: The one whereof wee haue handled; And the other we shall handle in due place. These moue swiftly, and at great distance; But then they require a *Medium* well disposed; And their *Transmission* is easily stopped.

906

The Third is the *Emissions*, which cause *Attraction* of *Certaine Bodies* at *Distance*; Wherein though the *Loadstone* be commonly placed in the First *Ranke*, yet we thinke good to except it, and referre it to another *Head*: But the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Siluer*, at distance; And the *Attraction* of *Heat* at distance; And that of *Fire* to *Naphtha*; And that of some *Herbs* to *Water*, though at distance; And diuers others; We shall handle, but yet not vnder this present *Title*, but vnder the *Title* of *Attraction* in generall.

The

The Fourth is the *Emission* of *Spirits*, and *Immateriate Powers* and *Vertues*, in those Things, which worke by the *Vniuersall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celestiall Influxes*, (as is vainly taught and receiued,) but by the *Primitive Nature* of *Matter*, and the *Seeds* of *Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Lead-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this Kinde is the *Motion* of *Gravity*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kinde is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West*: Of which kinde we conceiue the *Maine Float* and *Re-float* of the *Sea* is, which is by *Consent* of the *Vniuerse*, as *Part* of the *Diurnall Motion*. These *Immateriate Vertues* haue this *Property* differing from Others; That the *Diuersity* of the *Medium* hindreth them not; But they passe through all *Mediums*; yet at *Determinate distances*. And of these we shall speake, as they are incident to seuerall *Titles*.

907

The Fifth is the *Emissions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, vpon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be *Vehement*; And the *Operation* of the *Imagination*, if it be *Strong*. But these two are so *Coupled*, as we shall handle them together: For when an *Enuious*, or *Amorous Aspect*, doth infect the *Spirits* of Another, there is Ioynd both *Affection*, and *Imagination*.

908

The Sixth is, the *Influxes* of the *Heauenly Bodies*, besides those two Manifest Ones, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

909

The Seuenth is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* haue brought into an *Art*, or *Precept*: And it is this; That if you desire to Super-induce, any *Vertue* or *Disposition*, vpon a *Person*, you should take the *Liuing Creature*, in which that *Vertue* is most *Eminent*, and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you must take those *Parts*, in the *Time*, and *Act*, when that *Vertue* is most in *Exercise*; And then you must apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Cocke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take those *Parts* immediately after the *Lion*, or the *Cocke* haue beene in *Fight*; And let them be worne, vpon a *Mans Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake vnder this present *Title*.

910

The Eighth and last is, an *Emission* of *Immateriate Vertues*; Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly auouched by many: And wee haue set it downe, as a *Law* to our *Selues*, to examine things to the *Bottom*; And not to receiue vpon *Credit*, or reject vpon *Improbabilities*, vntill there hath passed a due *Examination*. This is, the *Sympathy* of *Individuals*: For as

911

there is a *Sympathy* of *Species*; So, (it may be) there is a *Sympathy* of *Individuals*: That is, that in *Things*, or the *Parts* of *Things*, that haue beene once *Contiguous*, or *Entire*, there should remaine a *Transmission* of *Vertue*, from the One to the Other: As betweene the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation* of *Vnguentum Teli*: And so of a *Pece* of *Lard*, or *Sticke* of *Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke vpon the other *Part* *Seuered*. Now wee will pursue the *Instances* themselves.

Experiments
in Confort,
touching Emis-
sion of Spirits
in Vapour, or
Exhalation, O-
dour-like.

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The *Plague* is many times taken without *Manifest Sense*, as hath beene said. And they report, that where it is found, it hath a *Sent*, of the *Smell* of a *Mellow Apple*; And (as some say) of *May-Flowers*: And it is also receiued, that *Smells* of *Flowers*, that are *Mellow* and *Lushious*, are ill for the *Plague*; As *White Lillies*, *Cowslips*, and *Hyacinths*.

The *Plague* is not easily receiued by such, as continually are about them, that haue the *Plague*; As *Keepers* of the *Sicke*, and *Physicians*; Nor againe by such as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe* and *Seed*; &c.) Or Outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Terre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and such as are of a *Dry* and *Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Blond*, more than to a *Stranger*.

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The most Pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*; When *Prisoners* haue beene Long, and Close, and Nastily kept; Whereof we haue had, in our time, Experience, twice or thrice; when both the *Judges* that sate vpon the *Iayle*, and Numbers of those that attended the *Businesse*, or were present, *Sickned* vpon it, and *Died*. Therefore it were good wisdom, that in such Cases, the *Iayle* were Aired, before they be brought forth.

915

Out of question, if such *Foule Smells* be made by *Art*, and by the *Hand*, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinckes*, which the *Nosthrils* streight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as haue some Similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may be great danger, in vsing such Compositions, in great Meetings of People, within Houses; As in *Churches*, At *Arraignments*, At *Playes* and *Solemnities*; And the like; For *Poysoning* of *Aire* is no lesse dangerous than *Poysoning* of *Water*; Which hath beene vsed by the *Turkes* in the Warres; And was vsed by *Emanuel Commenus* towards the *Christians*, when they passed thorow his *Countrie* to the *Holy Land*. And these *Empoisonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Because the much *Breath* of *People*, doth further the *Reception* of the *Infection*: And therefore, where any such Thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

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The *Empoisonment* of Particular *Persons*, by *Odours*, hath beene reported

ported to be in *Perfumed Gloues*, or the like: And it is like, they Mingle the *Payson* that is deadly, with some *Smels* that are Sweet, which also maketh it the sooner receiued. *Plagues* also haue been raised by *Annointings* of the *Chinckes* of *Doores*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet vpon their Fingers, to put them to their *Nose*; Which Men therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot be made without *Danger* of *Death*, to them that make them. But then againe, they may haue some *Antidotes* to saue themselves; So that *Men* ought not to be secure of it.

There haue beene, in diuers *Countries*, great *Plagues*, by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Lichests*, when they haue beene dead, and cast vpon *Heaps*.

It hapneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poysonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other *Workes*, about *Metals*, and *Minerals*, haue their *Brains* Hurt and Stupefied by the *Metalline Vapours*. Amongst which, it is noted, that the *Spirits* of *Quick-Siluer*, euer fly to the *Skull*, *Teeth*, or *Bones*; In so much as *Gilders* vse to haue a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Siluer*; Which *Gold* afterwards they finde to be *Whitened*. There are also certaine *Lakes*, and *Pits*, such as that of *Auernus*, that *Poyson Birds*, (as is said,) which fly ouer them; Or *Men*, that stay too long about them.

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a *Close Roome*, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little and little, Enducing only a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more *Sticks*, they fell to make *Fire* of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a *Generall Silence*, and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell downe in a *Swoone*; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saued themselves. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plastered*, if a *Fire* be made in them; Whereof no lesse *Man* than the *Emperour Iodiniannus* Died.

Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, vpon the *First Showers*, after long *Drought*.

It hath come to passe, that some *Apothecaries*, vpon *Stamping* of *Coloquintida*, haue beene put into a great *Skouring*, by the *Vapour* onely.

It hath beene a *Practise*, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it prouoketh a *Continuall Sneezing*, in those that are in the *Roome*.

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound-Eyes*; And that a *Menstruous Woman*, looking vpon a *Glasse*, doth rust it. Nay they haue

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haue an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going ouer a *Field*, or *Garden*, doe *Corne* and *Herbes* good by *Killing* the *Wormes*.

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The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that the *Wolfe*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

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Perfumes Conuenient doe dry and strengthen the *Braine*; And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dryed; and *Lignum Aloës*, and *Calamus*, taken at the *Mouth*, and *Nosthrils*; And no doubt there be other *Perfumes*, that doe moisten, and refresh; And are fit to be vsed in *Burning Agues*, *Consumptions*, and too much *Wakefulness*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaves* of *Vines* sprinckled with a little *Rose-Water*, &c.

926

They doe vse in *Sudden Faintings*, and *Swonnings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are vpon point to resolute, and fall away.

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Tobacco comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh partly by *Opening*; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to try the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*;) of other *Things*; As well to dry, and comfort, as for other *Intentions*. I wish *Triall* be made of the *Drying Fume*, of *Rose-Mary*, and *Lignum Aloës*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c.

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The *Following* of the *Plough*, hath been approued, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rye*, is not so good; Because the *Earth* hath spent her *Sweet Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it, when you sow *Barley*. But because *Ploughing* is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned vp, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling vpon a *Cushion*, and *Weeding*. And these *Things* you may practise in the best *Seasons*; Which is euer the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* be too *Moist*. I knew a great *Man*, that liued *Long*, who had a *Cleane Clod* of *Earth*, brought to him euery *Morning*, as he sate in his *Bed*; And he would hold his *Head* ouer it, a good pretty while. I commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greece Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; Prouided alwaies, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

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They haue, in *Physicke*, Vse of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Prouoking* of *Sleepe*, &c. For though those *Things* be not so *Strong* as *Perfumes*, yet you may haue them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*;

Times; And besides, there be diuers *Things*, that breath better of themselves, than when they come to the *Fire*; As *Nigella Romana*, the *Seed* of *Melanthium*, *Amomum*, &c.

There be two *Things*, which (inwardly vsed) doe Coole and condense the *Spirits*; And I wish the same to be tried outwardly, in *Vapours*. The One is *Nitre*, which I would haue dissolued in *Malmesey*, or *Greeke-Wine*, and so the *Smell* of the *Wine* taken; Or if you would haue it more forcible, poure of it vpon a *Fire-pan*, well heated, as they doe *Rose-Water*, and *Vinegar*. The other is, the *Distilled Water* of *Wilde Poppy*; which I wish to be mingled, at halfe, with *Rose-Water*, and so taken with some *Mixture* of a few *Clones*, in a *Perfuming-Pan*. The like would be done with the *Distilled Water* of *Saffron Flowers*.

Smells of *Muske*, and *Amber*, and *Ciuit*, are thought to further *Venerous Appetite*: Which they may doe by the *Refreshing* and *Calling forth* of the *Spirits*.

Incense, and *Nidorous Smells*, (such as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to dispose *Men* to *Deubtion*: Which they may doe, by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. Wee see, that amongst the *Jewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Vses*.

There be some *Perfumes*, prescribed by the *Writers* of *Naturall Magicke*, which procure *Pleasant Dreames*; And some others, (as they say,) that procure *Propheticall Dreames*; As the *Seeds* of *Flax*, *Fleawort*, &c.

It is certaine, that *Odours* doe, in a small Degree, *Nourish*; Especially the *Odour* of *Wine*: And we see *Men* a hungred, doe loue to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the *House*, complaine, that she should be kept from being at a *Feast*, and *Solemnity*, (which she much desired to see,) because there would be a *Corps* in the *House*; Whereupon he caused *Loaves* of *New Bread* to be sent for, and opened them; And powred a little *Wine* into them; And so kept himselfe aliue with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke*; But the same *Man* vsed to haue continually, a great *Wisse* of *Herbes*, that he smelled on: And amongst those *Herbes*, some *Esculent Herbs* of strong *Sent*; As *Onions*, *Garlicke*, *Leekes*, and the like.

They doe vse, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by those *Ill Smells*, the *Rising* of the *Mother* is put downe.

There be *Aires*, which the *Physitians* aduise their *Patients* to remoue vnto, in *Consumptions*, or vpon *Recovery* of *Long Sicknesse*: Which (commonly) are *Plaine Champaignes*, but *Grasing*, and not *Ouer-growne* with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groues* of *Bayes* doe forbid *Pestilent Aires*; Which was accounted

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accounted a great Cause of the Wholesome Aire of *Antiochia*. There be also some Soyles that put forth *Odorate Herbes* of themselves; As *Wilde Thyme*; *Wilde Maioram*; *Penny-Roiall*; *Camomill*; And in which the *Briar-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discouer an *Excellent Aire*.

937

It were good for Men, to thinke of having *Healthfull Aire*, in their Houses; Which will neuer be, if the *Roomes* be *Low-roofed*, or full of *Windows*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it Exceeding *Vnequall*; Which is a great Enemy to *Health*. The *Windows* also should not be high vp to the *Roofe*, (which is in vse for Beauty, and Magnificence,) but Low. Also *Stone-Walls* are not wholesome; But *Timber* is more wholesome; And especially *Brick*. Nay it hath beene vsed by some, with great Successe, to make their *Walls* thicke; And to put a Lay of *Chalke* betweene the *Bricks*, to take away all *Dampishnesse*.

Experiment
Solitary tou-
ching the Emif-
sions of Spiritual
Species which
Affect the Sen-
ses.

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These *Emissions*, (as we said before,) are handled, and ought to be handled, by themselves, vnder their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to giue some generall *Observations*, Common to both. First, they seeme to be *Incorporeall*. Secondly, they Worke *Swiftly*. Thirdly, they Worke at *Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effectiue* of any Thing; Nor leaue no *Worke* behinde them; But are *Energies* meerely; For their *Working* vpon *Mirrours*, and *Places* of *Echo*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Reper- cussed*. And as for the *Shaking* of *Windows*, or *Rarefying* the *Aire* by *Great Voyes*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake* a *Nature*, as they affect onely such a *Rare*, and *Attenuate Substance*, as is the *Spirit* of *Living Creatures*.

Experiments
in Confort,
touching the
Emission of Im-
materiate Ver-
tues from the
Minds, and
Spirits of Men,
either by Affe-
ctions, or by
Imaginations, or
by other Im-
pressions.

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It is mentioned in some *Stories*, that where *Children* haue been *Ex- posed*, or taken away young from their *Parents*; And that afterwards they haue approached to their *Parents* presence, the *Parents*, (though they haue not knowne them,) haue had a *Secret Ioy*, or Other *Alteration* thereupon.

There was an *Egyptian South-Sayer*, that made *Anthony* belecue, that his *Genius*, (which otherwise was *Brave*, and *Confident*,) was, in the Presence of *Octavianus Caesar*, *Poore*, and *Cowardly*: And therefore, he aduised him, to absent himselfe, (as much as he could,) and remoue far from him. This *South-Sayer* was thought to be suborned by *Cleopatra*, to make him liue in *Agypt*, and other Remote *Places* from *Rome*. How- fouer the Conceit of a *Predominant* or *Mastering Spirit*, of one Man ouer Another, is *Ancient*, and Receiued still, euen in *Vulgar Opi- nion*.

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There are Conceits, that some *Men*, that are of an *Ill*, and *Melancholy Nature*, doe incline the *Company*, into which they come, to be *Sad*, and *Ill disposed*; And contrariwise, that Others, that are of a *Iouiall Nature*, doe dispose the *Company* to be *Merry* and *Cheerefull*. And againe, that some *Men* are *Lucky* to be kept *Company* with, and *Employed*; And Others *Unlucky*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence* one with another, as well as from *Body* to *Body*.

It hath beene obserued, that *Old Men*, who haue loued *Young Company*, and beene Conuersant continually with them, haue beene of *Long Life*; Their *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which euer had *Young Auditours*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who liued till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilinus*, &c.

Audacity and *Confidence* doth, in *Ciuill Businesse*, so great Effects, as a *Man* may (reasonably) doubt, that besides the very *Daring*, and *Earnestnesse*, and *Persisting* and *Importunity*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits*, to such *Persons*.

The *Affections* (no doubt) doe make the *Spirits* more *Powerfull*, and *Active*; And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Loue*, and *Enuy*, which is called *Oculus Malus*. As for *Loue*, the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Louer*, doth passe into the *Spirits*, of the *Person Loued*; Which causeth the desire of *Returne* into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contact*, and *Coniunction*, which is in *Louers*. And this is obserued likewise, that the *Aspects* that procure *Loue*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Enuy*, that emitteth some *Maligne* and *Poysonous Spirit*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most Dangerous, when an *Enuious Eye* is cast vpon *Persons* in *Glory*, and *Triumph*, and *Ioy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Enuious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* haue beene ill disposed, for some Daies following. We see the Opinion of *Fascination* is Ancient, for both *Effects*; Of *Procuring Loue*; And *Sicknesse* caused by *Enuy*: And *Fascination* is euer by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most *Forcibly* by the *Eye*.

Feare, and *Shame*, are likewise *Infectiue*; For we see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalfe.

Now we will speake of the *Force of Imagination* vpon other *Bodies*; And of the *Meanes to Exalt and Strengthen it*. *Imagination*, in this Place, I vnderstand to be, the *Representation of an Indiuiduall Thought*. *Imagination* is of three Kinds: The First *Ioynd with Beleeve* of that which is to *Come*: The Second *Ioynd with Memory* of that which is *Past*: And the Third is of *Things Present*, or as if they were *Present*; For I comprehend in this, *Imaginations Faigned*, and at *Pleasure*; As if one should *Imagine* such a *Man* to be in the *Vestments* of a *Pope*; Or to haue *Wings*. I single out, for this time, that which is with *Faith*, or *Beleeve* of that which is to *Come*. The *Inquisition* of this *Subiect*, in our way, (which is by *Induction*,) is wonderfull hard; for the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly be made, but with *Extreme Caution*, for the *Reason* which wee will hereafter declare.

The *Power of Imagination* is in three Kindes; The First, vpon the *Body of the Imaginant*; Including likewise the *Childe* in the *Mothers Wombe*; The Second is, the *Power* of it vpon *Dead Bodies*, as *Plants, Wood, Stone, Metall, &c.* The Third is, the *Power* of it, vpon the *Spirits of Men, and Liuing Creatures*: And with this last we will onely meddle.

The *Probleme* therefore is, whether a *Man Constantly and Strongly Beleeuing*, that such a *Thing* shall be; (As that such an *One* will *Loue Him*; Or that such an *One* will *Grant him* his *Request*; Or that such an *One* shall *Recover a Sicknesse*; Or the like;) It doth helpe any thing to the *Effecting* of the *Thing* it selfe. And here againe we must warily distinguish; For it is not meant, (as hath beene partly said before,) that it should helpe by *Making a Man more Stout, or more Industrious*; (In which kinde a *Constant Beleeve* doth much;) But meerely by a *Secret Operation, or Binding, or Changing the Spirit of Another*: And in this it is hard, (as we began to say,) to make any *New Experiment*; For I cannot *command my Selfe to Beleeue* what I will, and so no *Triall* can be made. Nay it is worse; For whatsoeuer a *Man Imagineth* doubtingly, or with *Feare*, must needs doe hurt, if *Imagination* haue any *Power* at all;
For

For a *Man* representeth that oftner, that he feareth, than the contrary.

The Helpe therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beleeve*, and not by *Himselfe*; Vntill *Himselfe* haue found by *Experience*, that *Imagination* doth preuaile; For then *Experience* worketh in *Himselfe* *Beleeve*; If the *Beleeve*, that such a *Thing* shall be, be ioyned with a *Beleeve*, that his *Imagination* may procure it.

For Example; I related one time to a *Man*, that was Curious, and Vaine enough in these Things; *That I saw a Kinde of Iugler, that had a Paire of Cards, and would tell a Man what Card he thought.* This Pretended Learned Man told me; It was a Mistaking in Me; For (*said he*) *it was not the Knowledge of the Mans Thought, (for that is Proper to God,) but it was the Inforcing of a Thought vpon him, and Binding his Imagination by a Stronger, that he could Thinke no other Card.* And thereupon he asked me a *Question*, or two, which I thought he did but cunningly, knowing before what vsed to be the *Feats* of the *Iugler*. Sir, (*said hee*) *doe you remember whether he told the Card, the Man thought, Himselfe, or bade Another to tell it.* I answered (as was true;) *That he bade Another tell it.* Whereunto he said; *So I thought: For (said he) Himselfe could not haue put on so strong an Imagination; But by telling the other the Card, (who beleued that the Iugler was some Strange Man, and could doe Strange Things,) that other Man caught a strong Imagination.* I harkened vnto him, thinking for a Vanity he spoke prettily. Then he asked me another *Question*: Saith he; *Doe you remember, whether he bad the Man think the Card first, and afterwards told the other Man in his Eare, what he should thinke, Or else that he did whisper first in the Mans Eare, that should tell the Card, telling that such a Man should thinke such a Card, and after bade the Man thinke a Card?* I told him, as was true; *That he did first whisper the Man in the Eare, that such a Man should thinke such a Card: Vpon this the Learned Man did much Exult, and Please himselfe, saying; Loe, you may see that my Opinion is right: For if the Man had thought first, his Thought had beene Fixed; But the other Imagining first, bound his Thought.* Which though it did somewhat sinke with mee, yet I made it Lighter than I thought, and said; *I thought it was Confederacy, betweene the Iugler, and the two Seruants: Though (Indeed) I had no Reason so to thinke: For they were both my Fathers Seruants; And he had neuer plaid in the House before. The Iugler also did cause a Garter to be held vp; And tooke vpon him, to know, that such a One, should point in such a Place, of the Garter; As it should be neare so many Inches to the Longer End, and so many to the Shorter; And still he did it, by First Telling the Imaginer, and after Bidding the Actour Thinke.*

Hauiing told this *Relation*, not for the Weight thereof, but

because it doth handsomely open the *Nature* of the *Question*; I returne to that I said; That *Experiments* of *Imagination*, must be practised by Others, and not by a *Mans* *Selfe*. For there be Three *Meanes* to fortifie *Beleeve*: The First is *Experience*: The Second is *Reason*: And the Third is *Authoritie*: And that of these, which is farre the most *Potent*, is *Authoritie*: For *Beleeve* vpon *Reason*, or *Experience*, will Stagger.

947

For *Authoritie*, it is of two Kindes; *Beleeve* in an *Art*; And *Beleeve* in a *Man*. And for Things of *Beleeve* in an *Art*; A *Man* may exercise them by *Himselfe*; But for *Beleeve* in a *Man*, it must be by *Another*. Therefore, if a *Man* beleeue in *Astrologie*, and finde a *Figure* Prosperous; Or beleeue in *Naturall Magicke*, and that a *Ring* with such a *Stone*, or such a *Peece* of a *Living Creature*, Carried, will doe good; It may helpe his *Imagination*: But the *Beleeve* in a *Man* is farre the more *Actiue*. But howsoever, all *Authoritie* must be out of a *Mans* *Selfe*, turned (as was said,) either vpon an *Art*, or vpon a *Man*: And where *Authoritie* is from one *Man* to another, there the Second must be *Ignorant*, and not *Learned*, or *Full of Thoughts*; And such are (for the most part) all *Witches*, and *Superstitious Persons*; Whose *Beleeves*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reason*, or *Experience*: And vpon the same Reason, in *Magicke*, they vse (for the most part,) *Boyes*, and *Young People*; whose *Spirits* easiliest take *Beleeve*, and *Imagination*.

Now to fortifie *Imagination*, there be three *Wayes*: The *Authoritie* whence the *Beleeve* is deriued; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refresh* it.

948

For the *Authoritie*, wee haue already spoken: As for the Second; Namely the *Meanes* to *Quicken*, and *Corroborate* the *Imagination*; Wee see what hath beene vsed in *Magicke*; (If there be in those Practises any thing that is purely *Naturall*;) As *Vestments*; *Characters*; *Words*; *Seales*; Some *Parts* of *Plants*, or *Living Creatures*; *Stones*; *Choice* of the *Houre*; *Gestures* and *Motions*; Also *Incenses*, and *Odours*; *Choice* of *Societie*, which increaseth *Imagination*; *Diets* and *Preparations* for some time before. And for *Words*, there haue beene euer vsed, either *Barbarous Words*, of no Sense, lest they should disturbe the *Imagination*; Or *Words* of *Similitude*, that may second and feed the *Imagination*: And this was euer as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are vsed also *Scripture Words*; For that the *Beleeve*, that *Religious Texts*, and *Words*, haue Power, may strengthen the *Imagination*. And for the same Reason, *Hebrew Words*, (which amongst vs is counted the *Holy Tongue*, and the *Words* more *Mysticall*;) are often vsed.

949

For the *Refreshing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) Wee see the Practises of *Magicke*, as in *Images* of *Wax*, and

and the like, that should Melt by little, and little ; Or some other *Things Buried in Mucke*, that should Putrifie by little and little ; Or the like : For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Immateriate* a *Vertue*, as to worke at great *Distances* ; Or through all *Mediums* ; Or vpon all *Bodies* : But that the *Distance* must be *Competent* ; The *Medium* not *Aduerse* ; And the *Body* *Apt* and *Proportionate*. Therefore if there be any *Operation* vpon *Bodies*, in *Absence*, by *Nature* ; it is like to be conueyed from *Man* to *Man*, as *Fame* is ; As if a *Witch*, by *Imagination*, should hurt any as farre off, it cannot be naturally, but by *Working* vpon the *Spirit* of some, that commeth to the *Witch* ; And from that *Party* vpon the *Imagination* of *Another* ; And so vpon *Another* ; till it come to one that hath resort to the *Party Intended* ; And so by *Him* to the *Party intended* himselfe. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Party*, or the like ; yet there is lesse *Credit* to be giuen to those Things, except it be by *Working* of euill *Spirits*.

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, vpon other *Bodies*, are few, or none : For the *Experiments* of *Witchcraft*, are no cleare *Proofes* ; For that they may be, by a *Tacite Operation* of *Maligne Spirits* : We shall therefore be forced, in this *Enquirie*, to resort to *New Experiments* : Wherein wee can giue only *Directions* of *Trialls*, and not any *Positiue Experiments*. And if any *Man* thinke, that wee ought to haue staied, till wee had made *Experiment*, of some of them, our selues, (as wee doe commonly in other *Titles*,) the *Truth* is, that these *Effects* of *Imagination* vpon other *Bodies*, haue so little *Credit* with vs, as we shall trie them at leisure : But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessary, that He, by whom you worke, haue a *Precedent Opinion* of you, that you can doe *Strange Things* ; Or that you are a *Man of Art*, as they call it ; For else the *Simple Affirmation* to *Another*, that this or that shall be, can worke but a weake *Impression*, in his *Imagination*.

It were good, because you cannot discern fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did vse the *Imagination* of more than *One* ; That so you may light vpon a *Strong One*. As if a *Physician* should tell *Three*, or *Foure*, of his *Patients Seruants*, that their *Master* shall surely recouer.

The *Imagination* of *One*, that you shall vse, (such is the *Variety* of *Mens Mindes*,) cannot be alwaies alike *Constant*, and *Strong* ; And if the

Successe

950

951

952

953

Successes follow not speedily, it will faint and leese *Strength*. To remedy this, you must pretend to Him, whose *Imagination* you vse, severall *Degrees* of *Meanes*, by which to *Operate*; As to prescribe him, that euery three Dayes, if he finde not the Successes Apparent, he doe vse another *Root*, or *Part* of a *Beast*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another; till Seuen Times. Also you must prescribe a good Large Time for the *Effect* you promise; As if you should tell a *Servant* of a *Sick-Man*, that his *Master* shall recouer, but it will be Fourteene daies, care he findeth it apparently, &c. All this to entertaine the *Imagination*, that it wauer lesse.

954

It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenses* and *Perfumes* taken at the *Nostrills*; And *Ointments* of some *Parts*; doe (naturally) worke vpon the *Imagination* of Him that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you vse, if you prescribe him, before he doe vse the *Receit*, for the *Worke* which he desireth, that he doe take such a *Pill*, or a *Spoonfull* of *Liquour*; Or burne such an *Incense*; Or *Annoint* his *Temples*, or the *Soles* of his *Feet*, with such an *Ointment*, or *Oyle*: And you must chuse, for the *Composition* of such *Pill*, *Perfume*, or *Ointment*, such *Ingredients*, as doe make the *Spirits*, a little more *Grosse*, or *Muddy*: Whereby the *Imagination* will fix the better.

955

The *Body Passive*, and to be *Wrought Vpon*, (I meane not of the *Imaginant*,) is better wrought vpon, (as hath beene partly touched,) at some *Times*, than at others: As if you should prescribe a *Servant*, about a *Sick Person*, (whom you haue possessed, that his *Master* shall recouer,) when his *Master* is fast asleepe, to vse such a *Root*, or such a *Root*. For *Imagination* is like to worke better vpon *Sleeping Men*, than *Men Awake*, As wee shall shew when we handle *Dreames*.

956

We finde in the *Art* of *Memory*, that *Images Visible*, worke better than other *Conceits*: As if you would remember the Word *Philosophy*, you shall more surely doe it, by *Imagining* that such a *Man*, (For *Men* are best *Places*,) is reading vpon *Aristotles Physickes*; Than if you should Imagine him to say; *Ile goe study Philosophy*. And therefore, this *Observation* would be translated to the *Subject* wee now speake of: For the more *Lustrous* the *Imagination* is, it filleth and fixeth the better. And therefore I conceiue, that you shall, in that *Experiment*, (whereof wee spake before,) of *Binding* of *Thoughts*, lesse faile, if you tell One, that such an *One* shal name one of *Twenty Men*, than if it were *One* of *Twenty Cards*. The *Experiment* of *Binding* of *Thoughts*, would be *Diuersified*, and tried to the Full: And you are to note, whether it hit for the most part, though not alwaies.

957

It is good to consider, vpon what *Things*, *Imagination* hath most *Force*: And the *Rule*, (as I conceiue,) is, that it hath most *Force* vpon *Things*, that haue the *Lightest*, and *Easiest Motions*. And therefore aboue all, vpon the *Spirits* of *Men*: And in them, vpon such *Affections*, as moue *Lightest*; As vpon *Procuring* of *Loue*; *Binding* of *Lust*, which is
cuer

euier with *Imagination*; vpon *Men* in *Feare*; Or *Men* in *Irresolution*; And the like. Whatsoeuer is of this kinde would be thoroughly enquired. *Trialls* likewise would be made vpon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would *Dye* this yeare; And will him, at these and these times, to goe vnto it, to see how it thriue. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are very *Light Motions*; And there is a *Folly* very vsuall, that *Gamesters* imagine, that some that stand by them, bring them ill Lucke. There would be *Triall* also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such a *Name*, it shall goe off their *Fingars*: For these two are *Extreme Light Motions*. And howsoeuer I haue no *Opinion* of these things, yet so much I conceiue to be true; That *Strong Imagination* hath more Force vpon *Things Liuing*; Or that haue been *Liuing*, than *Things* meerely *Inanimate*: And more Force likewise vpon *Light*, and *Subtill Motions*, than vpon *Motions Vehement*, or *Ponderous*.

It is an vsuall *Obseruation*, that if the *Body* of One *Murthered*, be brought before the *Murtherer*, the *Wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, vpon the *Presence* of the *Murtherer*, hath opened the *Eyes*; And that there haue beene such like *Motions*, as well where the *Party Murthered* hath beene *Strangled*, or *Drowned*, as where they haue beene *Killed by Wounds*. It may be, that this participateth of a *Miracle*, by *Gods Iust Iudgement*, who vsuallly bringeth *Murthers* to *Light*: But if it be *Naturall*, it must be referred to *Imagination*.

The *Tying* of the *Point* vpon the day of *Marriage*, to make *Men* Impotent towards their *Wiuers*, which (as we haue formerly touched,) is so frequent in *Zant*, and *Gascony*, if it be *Naturall*, must be referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceiue it to haue the lesse *Affinity* with *Witchcraft*, because not *Peculiar Persons* onely, (such as *Witches* are,) but any *Body* may doe it.

There be many *Things*, that worke vpon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Pretious Stones*, worne, haue beene anciently and generally Received; And curiously assigned to worke seuerall *Effects*. So much is true; That *Stones* haue in them fine *Spirits*; As appeareth by their *Splendour*: And therefore they may worke by *Consent* vpon the *Spirits* of *Men*, to *Comfort*, and *Exhilarate* them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orientall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no *Credit* to be giuen to them. But it is manifest, that *Light*, aboue all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the same *Effect*, with more *Novelty*. And this is one of the *Causes*, why *Pretious Stones* comfort. And therefore it were good to haue *Tincted Lanthornes*,
or

958

959

Experiments
in Comfort,
touching the
Secret Vertue of
Sympathy, and
Antipathy.

960

or *Tincted Skreenes*, of *Glasfe Coloured* into *Groene*, *Blew*, *Carnation*, *Crimson*, *Purple*, &c. And to vse them with *Candles* in the *Night*. So likewise to haue *Round Glasses*, not onely of *Glasfe Coloured thorow*, but with *Colours* laid betweene *Crystals*, with *Handles* to hold in ones *Hand*. *Prismes* are also *Comfortable Things*. They haue of *Paris-Worke*, *Looking-Glasses*, bordered with broad *Borders* of small *Crystall*, and great *Counterfeit Pretious Stones*, of all *Colours*, that are most *Glorious* and *Pleasant* to behold; Especially in the *Night*. The *Pictures* of *Indian Feathers*, are likewise *Comfortable*, and *Pleasant* to behold. So also *Faire* and *Cleare Pooles* doe greatly comfort the *Eyes*, and *Spirits*; Especially when the *Sunne* is not *Glaring*, but *Ouercast*; Or when the *Moone* shineth.

961

There be diuers *Sorts* of *Bracelets* fit to *Comfort* the *Spirits*; And they be of *Three Intentions*: *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wish them to be of *Pearle*, or of *Corall*, as is vsed: And it hath beene noted that *Corall*, if the *Party* that weareth it be ill disposed, will wax *Pale*: Vvhich I beleue to be true, because otherwise *Distemper* of *Heat* will make *Corall* lose *Colour*. I commend also *Beads*, or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with some *Cordiall Mixture*.

962

For *Corroboracion* and *Confortation*, take such *Bodies* as are of *Astringent Quality*, without *Manifest Cold*. I commend *Bead-Amber*; which is full of *Astriction*, but yet is *Vnctuous*, and not *Cold*; And is conceiued to *Impinguate* those that weare such *Beads*: I commend also, *Beads* of *Harts-Horne*, and *Iuory*, which are of the like *Nature*; Also *Orange-Beads*; Also *Beads* of *Lignum Aloës*, *Macerated* first in *Rose-Water*, and *Dried*.

963

For *Opening*, I commend *Beads*, or *Peeeces* of the *Roots* of *Carduus Benedictus*: Also of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rew*.

964

The *Crampe*, (no doubt,) commeth of *Contraction* of *Sinnewes*; Which is *Manifest*, in that it commeth either by *Cold*, or *Drinesse*; As after *Consumptions*, and *Long Agues*: For *Cold* and *Drinesse* doe (both of them) *Contract*, and *Corrugate*. We see also, that *Chafing* a little about the *Place* in paine, easeth the *Crampe*; Which is wrought by the *Dilatation*, of the *Contracted Sinnewes*, by *Heat*. There are in vse, for the *Preuention* of the *Crampe*, two *Things*; The one *Rings* of *Sea-Horse Teeth*, worne vpon the *Fingers*; The other *Bands* of *Greene Periwinkle*, (the *Herbe*), tied about the *Calf* of the *Leg*, or the *Thigh*, &c. where the *Crampe* vseth to come. I doe finde this the more strange, because *Neither* of these haue any *Relaxing Vertue*, but rather the *Contrary*. I iudge therefore, that their *Working*, is rather vpon the *Spirits*, within the *Nerues*, to make them stricke lesse; Than vpon the *Bodily Substance* of the *Nerues*.

965

I would haue *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* the *Heart*, and *Spirits*; The one of the *Trochisch* of *Vipers*, made into little *Peeeces* of *Beads*; For since they doe great *Good Inwards*, (especially for *Pestilent Agues*,) it is like they will be *Effectuall Outwards*; Where they may be applied in greater *Quantity*. There would be *Trochisch* likewise made

made of *Snakes*; Whose *Flesh* dried, is thought to haue a very *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes*: The *Beads* would be made vp with *Amber-Grice*, and some *Pomander*.

It hath beene long receiued, and confirmed by diuers *Trialls*; That the *Root* of the *Male-Piony*, dried, tied to the *Necke*, doth helpe the *Falling-Sicknesse*; And likewise the *Incubus*, which wee call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossnesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therefore the *Working* is, by *Extreme*, and *Subtill Attenuation*; Which that *Simple* hath. I iudge the like to be in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c.

There is a *Stone*, which they call the *Bloud-Stone*, which worne is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is by *Astriction*, and *Cooling* of the *Spirits*. *Quere*, if the *Stone* taken out of the *Toads Head*, be not of the like *Vertue*? For the *Toade* loueth *Shade*, and *Coolnesse*.

Light may be taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinkle*, how that those things, which assuage the *Strife* of the *Spirits*, doe helpe diseases, contrary to the *Intention* desired: For in the *Curing* of the *Crampe*, the *Intention* is to relax the *Sinewes*; But the *Contraction* of the *Spirits*, that they striue lesse, is the best *Helpe*: So to procure easie *Tranaiels* of *Women*, the *Intention* is to bring downe the *Childe*; But the best *Helpe* is, to stay the *Comming* downe too *Fast*: Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pestilent Feaners*, the *Intention* is to expell the *Infection* by *Sweat*, and *Evaporation*; But the best *Meanes* to doe it, is by *Nitre*, *Diascordium*, and other *Cooler Things*, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily; In the *Quenching* of the *Flame* of a *Pestilent Ague*, *Nature* is like *People*, that come to quench the *Fire* of a *House*; which are so busie, as one of them letteth another. Surely, it is an *Excellent Axiome*, and of *Manifold Vse*, that whatsoever appeaseth the *Contention* of the *Spirits*, furthereth their *Action*.

The *Writers* of *Naturall Magick*, commend the *Wearing* of the *Spoile* of a *Snake*, for *Preseruing* of *Health*. I doubt it is but a *Conceit*; For that the *Snake* is thought to renew her *Youth*, by *Casting* her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a *Peccc* of a *Harts-Horne*, because those *Renue*.

It hath beene *Anciently Receiued*, (For *Pericles* the *Athenian* vsed it,) and it is yet in *vse*, to weare little *Bladders* of *Quick-Siluer*, or *Tablets* of *Arsenicke*, as *Preseruatiues* against the *Plague*: Not as they conceiue, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poisons* themselves, they draw the *Venome* to them, from the *Spirits*.

Vide the *Experiments* 95. 96. and 97. touching the *Seuerall Sympathies*, and *Antipathies*, for *Medicinall Vse*.

972

It is said, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beast* of great *Edacity*, and *Disgestion*; And so, it may be, the *Parts* of him comfort the *Bowels*.

973

We see *Scare-Crowes*, are set vp to keep *Birds* from *Corne*, and *Fruit*; It is reported by some, that the *Head* of a *Wolfe*, whole, dried, and hangd vp in a *Done-House*, will scare away *Vermine*; Such as are *Weasils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For those *Vermine* with vs, know *Dogs* better than *Wolues*.

974

The *Brains* of some *Creatures*, (when their *Heads* are roasted) taken in *Wine*, are said to strengthen the *Memory*: As the *Brains* of *Hares*; *Brains* of *Hens*; *Brains* of *Deeres*, &c. And it seemeth, to be incident to the *Brains* of those *Creatures*, that are Fearefull.

975

The *Ointment*, that *Witches* vse, is reported to be made, of the *Fat* of *Children*, digged out of their *Graves*; Of the *Iuyces* of *Smallage*, *Wolfebane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I suppose that the *Soporiferous Medicines* are likeliest to doe it; Which are *Hembane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaves*, &c.

976

It is reported by some, that the *Affections* of *Beasts*, when they are in *Strength*, doe adde some *Vertue*, vnto *Inanimate Things*; As that the *Skin* of a *Sheepe*, deuoured by a *Wolfe*, moueth *Itching*; That a *Stone*, bitten by a *Dog* in *Anger*, being throwne at him, drunke in *Powder*, prouoketh *Choler*.

977

It hath beene obserued, that the *Diet* of *Women* with *Childe*, doth worke much vpon the *Infant*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed*, (the *Nature* of both which is to repress and stay *Vapours*, that ascend to the *Braine*,) it will make the *Childe* Ingenious: And on the contrary side, if the *Mother* eat (much) *Onions*, or *Beanes*, or such *Vaporous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Fast* much; Or be giuen to much *Musing*; (All which send, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the same Iudgement of *Tobacco*, often taken by the *Mother*.

978

The *Writers* of *Naturall Magicke* report, that the *Heart* of an *Ape*, worne neare the *Heart*, comforteth the *Heart*, and increaseth *Audacity*. It is true, that the *Ape* is a Merry and Bold *Beast*. And that the same *Heart* likewise of an *Ape*, applied to the *Necke*, or *Head*, helpeth the *Wit*; And is good for the *Falling-Sicknesse*: The *Ape* also is a Witty *Beast*, and hath a *Dry Braine*; Which may be some *Cause* of *Attenuation* of *Vapours* in the *Head*. Yet it is said to moue *Dreames* also. It may be, the *Heart* of a *Man* would doe more, but that it is more against *Mens Mindes* to vse it; Except it be in such as weare the *Reliques* of *Saints*.

979

The *Flesh* of a *Hedge-Hog*, Dressed, & Eaten, is said to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, must needs be *Harsh*, and *Dry*, because it putteth forth so many *Prickles*: For *Plants* also, that are full of *Prickles*,

Prickles, are generally Dry: As *Briars*, *Thornes*, *Berberries*: And therefore the *Asbes* of a *Hedge-Hog* are said to be a great *Desiccative* of *Fistulas*.

Mummy hath great force in *Stanching* of *Bloud*; which, as it may be ascribed to the *Mixture* of *Balmes*, that are *Glistinous*; So it may also partake of a *Secret Propriety*; In that the *Bloud* draweth *Mans Flesh*. And it is approued, that the *Mosse*, which groweth vpon the *Skull* of a *Dead Man*, vnburied, will stanch *Bloud* potently. And so doe the *Dregs*, or *Powder* of *Bloud*, seuered from the *Water*, and *Dried*.

It hath beene practised, to make *White Swallowes*, by *Annointing* of the *Egs* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more *Penurious*. And it may be, the *Annointing* of the *Egs*, will be as *Effectuall*, as the *Annointing* of the *Body*; Of which *Viae* the *Experiment* 93.

It is reported, that the *White* of an *EGge*, or *Blond*, mingled with *Salt-Water*, doth gather the *Saltnesse*, and maketh the *Water* sweeter. This may be by *Adhesion*; As in the 6. *Experiment* of *Clarification*: It may be also, that *Bloud*, and the *White* of an *EGge*, (which is the *Matter* of a *Liuing Creature*,) haue some *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. We see that *Salt*, laid to a *Cut Finger*, healeth it; So as it seemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.

It hath beene anciently receiued, that the *Sea-Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the *Body*,) and erodeth them. Whereof the *Cause* is conceiued to be, a *Quality* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* haue vpon the *Watry Parts* of the *Body*; As *Yrine* and *Hydropicall Water*. And it is a good *Rule*, that whatsoever hath an *Operation* vpon certaine *Kindes* of *Matters*, that, in *Mans Body*, worketh most vpon those *Parts*, wherein that *Kinde* of *Matter* aboundeth.

Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathy* with the same *Thing*, when it is *Aline*, and when it is *Sound*; And with those *Parts* which doe *Excerne*: As a *Carkasse* of *Man* is most *Infectious*, and *Odious* to *Man*; A *Carrian* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Vlcers*, *Carbuncles*, *Pockes*, *Scabs*, *Leprousie*, to *Sound Flesh*; And the *Excrement* of euery *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse *Pernicious* than the *Corruptions*.

It is a *Common Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection*, some *Petty Fellow* is sent out to kill the *Dogges*; And that, though they haue neuer scene him before, yet they will all come forth, and barke, and fly at him.

The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so vnertaine, as they require a great deale of *Examination*, ere wee conclude vpon them. I would haue it first thoroughly inquired, whether there be any *Secret Passages* of *Sympathy*, betweene

Persons of neare Blood; As Parents, Children, Brothers, Sisters, Nurse-Children, Husbands, Wives, &c. There be many Reports in *Historie*, that vpon the *Death* of *Persons* of such Nearenesse, *Men* haue ha' an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dream*, which I told to diuers *English Gentlemen*; That my *Fathers* *House*, in the *Countrey*, was *Plastered* all ouer with *Blacke Mortar*. There is an *Opinion* abroad, (whether *Idle* or no I cannot say,) That louing and kinde *Husbands*, haue a *Sense* of their *Wives* *Breeding* *Childe*, by some *Accident* in their owne *Body*.

987

Next to those that are *Neare* in *Blood*, there may be the like *Passage*, and *Instincts* of *Nature*, betweene great *Friends*, and *Enemies*: And sometimes the *Reuealing* is vnto Another *Person*, and not to the *Party* *Himselfe*. I remember *Philippus Comminens*, (a graue *Writer*,) reporteth; That the *Arch-Bishop* of *Vienna*, (a *Reuerend Prelate*,) said (one day) after *Mass*, to *King Lewis* the eleuenth of *France*; *Sir, your Mortall Enemy is dead*; What time *Duke Charles* of *Burgundie* was *Slaine*, at the *Battell* of *Granson*, against the *Switzers*. Some triall also would be made, whether *Pact* or *Agreement* doe any thing; As if two *Friends* should agree, that such a *Day* in every *Week*, they being in farre *Distant Places*, should *Pray* one for Another; Or should put on a *Ring*, or *Tablet*, one for anothers *Sake*; Whether if one of them should breake their *Vow* and *Promise*, the other should haue any *Feeling* of it, in *Absence*.

988

If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons*; It is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes*: As if a *Victorie* should be won, or lost, in *Remote Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth; Because of the great *Ioy*, or *Griefe*, that many *Men* are possesse with, at once? *Pius Quintus*, at the very time, when that *Memorable Victorie* was won, by the *Christians*, against the *Turks*, at the *Navall Battell* of *Lepanto*, being then hearing of *Causes* in *Consistorie*, brake off suddenly, and said to those about him; *It is now more time, we should giue thanks to God, for the great Victorie he hath granted vs, against the Turks*. It is true, that *Victorie* had a *Sympathie* with his *Spirit*; For it was meerey his *Worke*, to conclude that *League*. It may be, that *Revelation* was *Diuine*; But what shall wee say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Playes*, haue had *Newes* of *Victories*, and *Overthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superstition*: Namely, that *Men* obserue when *Things* *Hit*, and not when they *Misse*: And commit to *Memory* the one, And forget and passe ouer the other. But touching *Diuination*, and the *Misgining* of *Mindes*, wee shall

shall speake more, when wee handle in generally, the Nature of Mindes, and Soules, and Spirits.

Wee haue giuen formerly some *Rules of Imagination*; And touching the *Fortifying* of the Same. Wee haue set downe also some few *Instances*, and *Directions*, of the Force of *Imagination*, vpon *Beasts*, *Birds*, &c. vpon *Plants*; And vpon *Inanimate Bodies*: Wherein you must still obserue, that your *Trialls* be vpon *Subtill* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*: And I leaue it to euery *Man*, to choose *Experiments*, which himselfe thinketh most *Commodious*; Giuing now but a few *Examples* of euery of the Three *Kindes*.

Vse some *Imaginant*, (observing the *Rules* formerly prescribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Tria also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Cocke* more *Hardy*, and the other more *Cowardly*. It would be tried also, in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hare*, with *Grey-hounds*; Or in *Horse-Races*; And the like *Comparative Motions*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dogge* goe slower, than to make him stand still that he may not run.

In *Plants* also, you may trie the Force of *Imagination*, vpon the *Lighter Sort* of *Motions*: As vpon the *Sudden Fading*, or *Linely Comming up* of *Herbs*; Or vpon their *Bending* one way, or other; Or vpon their *Closing*, and *Opening*; &c.

For *Inanimate Things*, you may trie the Force of *Imagination*, vpon *Staying* the *Working* of *Beere*, when the *Barme* is put in; Or vpon the *Comming* of *Butter*, or *Cheese*, after the *Cherting*, or the *Renner* bee put in.

It is an *Ancient Tradition*, euery where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long *Sticke*, doth stupefie the *Hand* of him that toucheth it. It is one degree of *Working at Distance*, to worke by the Continuance of a *Fit Medium*; As *Sound* will be conueyed to the *Eare*, by striking vpon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*.

The *Writers* of *Naturall Magicke*, doe attribute much to the *Vertues*, that come from the *Parts* of *Living Creatures*; So as they be taken from them, the *Creatures* remaining still aliue: As if the *Creature* still liuing did infuse some *Immaterial Vertue*, and *Vigour*, into the *Part Senered*. So much may be true; that any *Part*, taken from a *Living Creature*, newly *Slaine*, may be of greater force, than if it were taken from the like *Creature*, dying of it *Selfe*, because it is fuller of *Spirit*.

Triall would be made, of the like *Parts* of *Individualls*, in *Plants*, and *Living Creatures*; As to cut off a *Stocke* of a *Tree*; And so lay that, which you cut off, to *Putrifie*, to see whether it will Decay the *Rest* of the *Stocke*: Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*,
or

or a *Cat*, and lay it to *Putrifie*, and so see whether it will *Fester*, or keepe from *Healing*, the *Part* which remaineth.

996 It is receiued, that it helpeth to *Continue Love*, if one weare a *Ring*, or a *Bractlet*, of the *Haire* of the *Party Beloued*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Glove*, or other like *Fanour*, may as well doe it.

997 The *Sympathie* of *Indiuiduals*, that haue beene *Entire*, or haue *Touched*, is of all others the most *Incredible*: Yet according vnto our faithfull Manner of *Examination* of *Nature*, wee will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waste, and consume, is a *Common Experiment*: And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a *Wart* vpon one of my *Fingers*: Afterwards when I was about Sixteene Yeeres old, being then at *Paris*, there grew vpon both my *Hands* a Number of *Warts*, (at the least an hundred,) in a *Moneths* space. The *English Embassadors Lady*, who was a *Woman* farre from *Superstition*, told me, one day; She would helpe me away with my *Warts*: Whereupon she got a *Peece* of *Lard*, with the *Skin* on, and rubbed the *Warts* all ouer, with the *Fat Side*; And amongst the rest that *Wart*, which I had had from my *Childhood*; Then she tailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, vpon a *Post* of her *Chamber Window*, which was to the *South*. The *Succeffe* was, that within five weekes space, all the *Warts* went quite away: And that *Wart*, which I had so long endured, for *Company*. But at the rest I did little maruell, because they came in a *Short* time, and might goe away in a *Short Time* againe: But the *Going away* of that, which had stand so long, doth yet sticke with mee. They say the like is done, by the *Rubbing* of *Warts* with a *Greene Elder Sticke*, and then *Burying* the *Sticke* to *Rot* in *Mucke*. It would be tried, with *Cornes*, and *Wens*, and such other *Excreescences*. I would haue it also tried, with some *Parts*, of *Liuing Creatures*, that are neareste the *Nature* of *Excreescences*; As the *Combes* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would haue it tried both wayes; Both by *Rubbing* those *Parts* with *Lard*, or *Elder*, as before; And by *Cutting off* some *Peece* of those *Parts*, and laying it to *Consume*; To see whether it will *Worke* any *Effect*, towards the *Consumption* of that *Part*, which was once *ioyned* with it.

998 It is constantly Receiued, and Auouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, vpon the Relation of *Men* of *Credit*, (though my selfe, as yet, am not fully inclined to beleue it,) you shall note the *Points* following. First, the *Ointment*, wherewith this is done, is made of *Diuers Ingredients*; whereof the *Strangest* and *Hardest* to come by, are the *Masse* vpon the *Skull* of a *dead Man*, *Unburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a *Scarting Hole*; That if the *Experiment* proued not, it might be pretended, that the *Beasts* were not killed in the due *Time*;

For

For as for the *Mosse*, it is certaine, there is great Quantitie of it in *Ireland*, vpon *Slaine Bodies*, laid on *Heaps*, *Vnburied*. The other *Ingredients* are, the *Blond-Stone* in *Powder*, and some other *Things*, which seeme to haue a *Vertue* to *Stanch Blood*; As also the *Mosse* hath. And the *Description* of the whole *Ointment* is to be found in the *Chymicall Dispensatorie* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but only applied to the *Weapon*. Thirdly, (which I like well) they doe not obserue the *Confecting* of the *Ointment*, vnder any certaine *Constellation*; which commonly is the *Excuse* of *Magickall Medicines*, when they faile, that they were not made vnder a fit *Figure* of *Heauen*. Fourthly, it may be applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the *Party*, to be *Cured*, is not needfull to *Concurre*; For it may be done, without the *Knowledge*, of the *Party Wounded*; And thus much hath beene tried, that the *Ointment* (for *Experiments* sake,) hath beene wiped off the *Weapon*, without the *knowledge* of the *Party Hurt*, and presently the *Party Hurt*, hath beene in great *Rage* of *Paine*, till the *Weapon* was *Reannointed*. Sixthly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Anointing* of that *Instrument* will serue, and worke the *Effect*. This I doubt should be a *Deuice*, to keepe this strange *Forme* of *Cure*, in *Request*, and *Vse*; Because many times you cannot come by the *Weapon* it selfe. Seuenthly, the *Wound* must be at first *Washed cleane*, with *White Wine*, or the *Parties owne Water*; And then bound vp close in *Fine Linnen*, and no more *Dressing* renewed, till it be *whole*. Eighthly, the *Sword* it selfe must be *Wrapped vp Close*, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you wipe it off from the *Sword*, and keepe it, will *Serue* againe; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointments* of *Wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*; which I like best of all the rest, because it subiecteth the *Matter*, to an *Easie Triall*.

I would haue *Men* know, that though I reprehend, the *Easie Pasing over*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*; (For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not vnderstand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be *Cooling*; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receiue from *Experience*, that *Powder* of *Chamapytis*, or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wise *Physitian* doth not continue still

Experiment
Solitary touching
Secret
Proprieties.

999

still the same *Medicine*, to a *Patient*; But he will vary, if the first *Medicine* doth not apparently succeed: For of those *Remedies*, that are good for the *Jaundies*, *Stone*, *Agues*, &c. that will doe good in one *Body*, which will not doe good in Another; According to the Correspondence the *Medicine* hath to the *Individuall Body*.

Experiment
Solitary, touch-
ing the Gene-
rall Sympathy of
Mens Spirits.

1000

The *Delight* which *Men* haue in *Popularity*, *Fame*, *Honour*, *Submission*, and *Subiection* of other *Mens Mindes*, *Wills*, or *Affections*, (although these *Things* may be desired for other *Ends*,) seemeth to be a *Thing*, in it selfe, without Contemplation of Consequence, Gratefull & agreeable to the *Nature of Man*. This *Thing* (surely) is not without some Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Diuine Limbus*;

Else why should *Men* be so much affected with that, which others

thinke, or say? The best Temper of *Mindes* desireth Good

Name, and *True Honour*: The Lighter, *Popularity*, and

Applause; The more depraued, *Subiection*, and *Ty-*

ranny; As is scene in great *Conquerours*, and

Troublers of the *World*: And yet more in

*Arch-Hereticke*s; for the Introdu-

cing of new *Doctrines*, is like-

wile an *Affectation* of *Ty-*

ranny, ouer the *Under-*

standings, and

Beliefes of

Men.

A

A TABLE OF the Experiments.

Century. I.



<i>Of Strayning or Percolation, Outward and inward :</i>	Experiments 8.	page 1
<i>Of Motion upon Pressure.</i>	Experiments 5.	page 3
<i>Of Separations of Bodies Liquid by weight.</i>	Exper. 3.	pag. 4
<i>Of Infusions, in Water and Aire.</i>	Exper. 7.	pag. 5
<i>Of the Appetite of Continuation in Liquids.</i>	Exper. 1.	pag. 6
<i>Of Artificiall Springs.</i>	Exper. 1.	pag. 7
<i>Of the Venemous Quality of Mans flesh.</i>	Exp. 1.	ibid.
<i>Of Turning Aire into Water.</i>	Exp. 1.	pag. 8
<i>Of Helping or Altering the Shape of the Body.</i>	Exp. 1.	ibid.
<i>Of Condensing of Aire, to yeeld Weight, or Nourishment.</i>	Exp. 1.	pag. 9
<i>Of Flame and Aire Commixed.</i>	Exp. 1.	pag. 10
<i>Of the Secret Nature of Flame.</i>	Exp. 1.	ibid.
<i>Of Flame, in the Midst, and on the Sides.</i>	Exp. 1.	pag. 11
<i>Of Motion of Gravity.</i>	Exp. 1.	ibid.
<i>Of Contraction of Bodies in Bulke.</i>	Exp. 1.	pag. 12
<i>Of making Vines more fruitfull.</i>	Exp. 1.	ibid.
<i>Of the Seuerall Operations of Purging Medicines.</i>	Exp. 9.	ibid.
<i>Of Meats and Drinkes most Nonrishing.</i>	Exp. 15.	pag. 15
<i>Of Medicines applied in Order.</i>	Exp. 1.	pag. 19
<i>Of Cure by Custome.</i>	Exp. 1.	pag. 20
<i>Of Cure by Excesse.</i>	Exp. 1.	ibid.
<i>Of Cure by Motion of Consent.</i>	Exp. 1.	ibid.
<i>Of Cure of Diseases contrary to Predisposition.</i>	Exp. 1.	pag. 21
<i>Of Preparation before and after Purging.</i>	Exp. 1.	ibid.
<i>Of Stanching Bloud.</i>	Exp. 1.	pag. 22
<i>Of Change of Aliments and Medicines.</i>	Exp. 1.	ibid.

The Table.

Of Diets. Exp. 1.	ibid.
Of Production of Cold. Exp. 7.	ibid.
Of Turning Aire into water. Exp. 7.	pag. 24
Of Induration of Bodies. Exp. 8.	pag. 26
Of Prezing of Aire upon Water. Exp. 1.	pag. 28
Of the Force of Union. Exp. 1.	pag. 29
Of Making Feathers and Haïres of diuers Colours. Exp. 1.	ibid.
Of Nourishment of young Creatures, in the Egge, or Wombe. Exp. 1.	pag. 30
Of Sympathy, and Antipathy. Exp. 3.	ibid.
Of the Spirits, or Pneumaticalls in Bodies. Exp. 1.	pag. 31
Of the Power of Heat. Exp. 1.	pag. 32
Of Impossibility of Annihilation. Exp. 1.	pag. 33

Century. II.

O F Musicke. Exp. 14.	pag. 35
Of the Nullity and Entity of Sounds. Exp. 9.	pag. 39
Of Production, Conseruation, and Delation of Sounds. Exp. 14.	P. 41
Of Magnitude, Exility, and Damps of Sounds. Exp. 25.	pag. 45
Of Loudnesse, and Softnesse of Sounds. Exp. 3.	pag. 49
Of Communication of Sounds. Exp. 3.	ibid.
Of Equality and Inequality of Sounds. Exp. 9.	pag. 50
Of more Treble and Base Tones. Exp. 6.	pag. 52
Of Proportion of Treble and Base. Exp. 4.	pag. 53
Of EXterieur, and Interieur Sounds. Exp. 4.	pag. 54
Of Articulation of Sounds. Exp. 9.	ibid.

Century. III.

O F the Lines in which Sounds move. Exp. 6.	pag. 57
Of the Lasting or Perishing of Sounds. Exp. 5.	pag. 58
Of the Passage or Interception of Sounds. Exp. 5.	pag. 59
Of the Medium of Sounds. Exp. 4.	pag. 60
Of the Figures of Bodies yeelding Sounds. Exp. 3.	pag. 61
Of Mixture of Sounds. Exp. 5.	pag. 62
Of Melioration of Sounds. Exp. 7.	pag. 63
Of Imitation of Sounds. Exp. 6.	pag. 64
Of Reflexion of Sounds. Exp. 13.	pag. 65
Of Consent and Dissent betweene Audibles, and Visibles. Exp. 23.	pag. 68

of

The Table.

Of Sympathie and Antipathie of Sounds. Exp. 5.	pag. 72
Of Hindring or Helping of Hearing. Exp. 4.	pag. 73
Of the Spirituall and Fine Nature of Sounds. Exp. 4.	ibid.
Of Orient Colours in Dissolutions of Metalls. Exp. 1.	pag. 74
Of Prolongation of Life. Exp. 1.	pag. 75
Of the Appetite of Vnion in Bodies. Exp. 1.	ibid.
Of the like Operations of Heat and Time. Exp. 1.	pag. 76
Of the Differing Operations of Fire and Time. Exp. 1.	ibid.
Of Motions by Imitation. Exp. 1.	ibid.
Of Infectious Diseases. Exp. 1.	ibid.
Of the Incorporation of Powders and Liqueurs. Exp. 1.	pag. 77
Of Exercise of the Body ; And the Benefits, or Emils thereof. Exp. 1.	ibid.
Of Meats soome Glutting, or Not Glutting. Exp. 1.	ibid.

Century. IV.

O f Clarification of Liqueurs, and the Accelerating thereof. Exp. 11.	pag. 81
Of Maturation, and the Accelerating thereof ; And of the Maturation of Drinks, and Fruits. Exp. 15.	pag. 83
Of Making Gold. Exp. 1.	pag. 86
Of the Seuerall Natures of Gold. Exp. 1.	pag. 88
Of Inducing and Accelerating Putrefaction. Exp. 12.	ibid.
Of Prohibiting and Preuenting Putrefaction. Exp. 11.	pag. 90
Of Rotten Wood Shining. Exp. 1.	pag. 93
Of Acceleration of Birth. Exp. 1.	pag. 94
Of Acceleration of Growth and Stature. Exp. 1.	ibid.
Of Bodies Sulphureous and Mercuriall. Exp. 5.	pag. 95
Of the Chameleon. Exp. 1.	pag. 96
Of Subterrany Fires. Exp. 1.	pag. 97
Of Nitrous Water. Exp. 1.	ibid.
Of Congealing of Aire. Exp. 1.	ibid.
Of Congealing Water into Crystall. Exp. 1.	ibid.
Of Preseruing the Smell, and Colour, in Rose-Leaues. Exp. 1.	pag. 98
Of the Lasting of Flame. Exp. 10.	ibid.
Of Infusions or Burialls of diuers Bodies in Earth. Exp. 5.	pag. 101
Of the Effects of Mens Bodies from seuerall Winds. Exp. 1.	pag. 102
Of Winter and Summer Sickneses. Exp. 1.	ibid.
Of Pestilentiall Yeares. Exp. 1.	ibid.
Of Epidemicall Diseases. Exp. 1.	ibid.
Of Preservation of Liqueurs in Wells, or deepe Vanles. Exp. 1.	ibid.

of

The Table.

<i>Of Staining.</i> Exp. 1.	pag. 103
<i>Of Sweet Smells.</i> Exp. 4.	ibid.
<i>Of the Goodnesse, and Choice of Waters.</i> Exp. 7.	pag. 104
<i>Of Temperate Heats under the Equinoctiall.</i> Exp. 1.	pag. 105
<i>Of the Colouration of Blacke and Tawney Moores.</i> Exp. 1.	ibid.
<i>Of Motion after the Instant of Death.</i> Exp. 1.	pag. 106

Century. V.

O <i>F Accelerating or Hastening forward Germination.</i> Exper. 12.	pag. 109
<i>Of Retarding or putting backe Germination.</i> Exp. 9.	pag. 112
<i>Of Meliorating, or making better, Fruits, and Plants.</i> Exp. 55.	pag. 114
<i>Of Compound Fruits, and Flowers.</i> Exp. 3.	pag. 122
<i>Of Sympathy and Antipathy of Plants.</i> Exp. 19.	pag. 123
<i>Of Making Herbs and Fruits Medicinable.</i> Exp. 1.	pag. 128

Century. VI.

O <i>F Curiosities about Fruitts, and Plants.</i> Exp. 17.	pag. 131
<i>Of the Degenerating of Plants ; And of their Transmutation one into another.</i> Exp. 14.	pag. 135
<i>Of the Proceritie and Lownesse of Plants ; And of Artificiall Dwarfing them.</i> Exp. 5.	pag. 138
<i>Of the Rudiments of Plants ; And of the Excreſcences of Plants, or Super-Plants.</i> Exp. 26.	ibid.
<i>Of producing Perfect Plants without Seed.</i> Exp. 11.	pag. 143
<i>Of Foraine Plants.</i> Exp. 3.	pag. 144
<i>Of the Seasons of severall Plants.</i> Exp. 6.	pag. 145
<i>Of the Lasting of Plants.</i> Exp. 5.	pag. 146
<i>Of severall Figures of Plants.</i> Exp. 3.	pag. 147
<i>Of some principall Differences in Plants.</i> Exp. 4.	pag. 148
<i>Of all Manner of Composts and Helps for Ground.</i> Exp. 6.	pag. 149

Century.

The Table.

Century. VII.

O F the Affinities and Differences betweene Plants, and Bodies Inanimate. Exp. 6.	pag. 153
Of Affinities and Differences betweene Plants, and Living Creatures; And of the Confiners and Participles of Both. Exp. 3.	pag. 154
Of Plants Experiments Promiscuous. Exp. 67.	pag. 155
Of Healing of Wounds. Exp. 1.	pag. 169
Of Fat diffused in Flesh. Exp. 1.	ibid.
Of Ripening Drinke speedily. Exp. 1.	pag. 170
Of Pilositie and Plumage. Exp. 1.	ibid.
Of the Quicknesse of Motion in Birds. Exp. 1.	ibid.
Of the Clearnesse of the Sea, the North Wind blowing. Exp. 1.	ibid.
Of the Different Heats of Fire and Boyling Water. Exp. 1.	ibid.
Of the Qualification of Heat by Moisture. Exp. 1.	pag. 171
Of Tanning. Exp. 1.	ibid.
Of the Hiccough. Exp. 1.	ibid.
Of Sweezing. Exp. 1.	pag. 172
Of the Tendernesse of the Teeth. Exp. 1.	ibid.
Of the Tongue. Exp. 1.	ibid.
Of the Mouth out of Taste. Exp. 1.	ibid.
Of some Prognosticks of Pestilentiall Seasons. Exp. 1.	ibid.
Of Speciall Simples for Medicines. Exp. 1.	ibid.
Of Venus. Exp. 3.	pag. 173
Of the Insecta, or Creatures bred of Putrefaction. Exp. 3.	pag. 174
Of Leaping. Exp. 1.	pag. 177
Of the Pleasures and Displeasures of Hearing, and of the other Senses. Exp. 1.	ibid.

Century. VIII.

O F Veines of Earth Medicinall. Exp. 1.	pag. 181
Of Sponges. Exp. 1.	ibid.
Of Sea-Fish in Fresh Waters. Exp. 1.	pag. 182
Of Attraction by Similitude of Substance. Exp. 1.	ibid.
Of Certaine Drinks in Turkey. Exp. 1.	ibid.
Of Sweat. Exp. 6.	pag. 183
Of the Glo-Worme. Exp. 1.	pag. 184

of

The Table.

<i>Of the Impressions upon the Body, from severall Passions of the Mind.</i>	Exp. 10.	ibid.
<i>Of Drunkennesse.</i>	Exp. 4.	pag. 187
<i>Of the Hurt, or Helpe of Wine, taken moderately.</i>	Exp. 1.	pag. 188
<i>Of Caterpillers.</i>	Exp. 1.	ibid.
<i>Of the Flies Cantharides.</i>	Exp. 1.	pag. 189
<i>Of Lassitude.</i>	Exp. 3.	ibid.
<i>Of Casting the Skin, and Shell, in some Creatures.</i>	Exp. 1.	ibid.
<i>Of the Postures of the Body.</i>	Exp. 3.	pag. 190
<i>Of Pestilentiall Teares.</i>	Exp. 1.	ibid.
<i>Of some Prognosticks of Hard Winters.</i>	Exp. 1.	ibid.
<i>Of certaine Medicines that condense and releene the Spirits.</i>	Exp. 1.	pag. 191
<i>Of paintings of the Body.</i>	Exp. 1.	ibid.
<i>Of the use of Bathing, and Annointing.</i>	Exp. 1.	ibid.
<i>Of Chamoletting of Paper.</i>	Exp. 1.	pag. 192
<i>Of Cattle-Inke.</i>	Exp. 1.	ibid.
<i>Of Earth increasing in Weights.</i>	Exp. 1.	ibid.
<i>Of Sleepe.</i>	Exp. 3.	ibid.
<i>Of Teeth, and Hard Substances in the Bodies of Lining Creatures.</i>	Exp. 11.	pag. 193
<i>Of the Generation, and Bearing of Lining Creatures in the Wombe.</i>	Exp. 3.	pag. 195
<i>Of Species Visible.</i>	Exp. 2.	pag. 196
<i>Of Impulsion, and Percussion.</i>	Exp. 3.	pag. 197
<i>Of Tisillation.</i>	Exp. 1.	pag. 198
<i>Of Scarcity of Raine in Egypt.</i>	Exp. 1.	ibid.
<i>Of Clarification.</i>	Exp. 1.	ibid.
<i>Of Plants without Leaves.</i>	Exp. 1.	pag. 199
<i>Of the Materialls of Glasse.</i>	Exp. 1.	ibid.
<i>Of Prohibition of Putrefaction, and the long Conservation of Bodies.</i>	Exp. 1.	ibid.
<i>Of Abundance of Nitre in certaine Sea-Shoares.</i>	Exp. 1.	ibid.
<i>Of Bodies borne up by Water.</i>	Exp. 1.	ibid.
<i>Of Fuell consuming little or nothing.</i>	Exp. 1.	ibid.
<i>Of Cheape Fuell.</i>	Exp. 1.	pag. 201
<i>Of Gathering of Wind for Freshnesse.</i>	Exp. 1.	ibid.
<i>Of Trialls of Aires.</i>	Exp. 1.	ibid.
<i>Of Increasing Milke in Milch-Beasts.</i>	Exp. 1.	ibid.
<i>Of Sand of the Nature of Glasse.</i>	Exp. 1.	pag. 202
<i>Of the Growth of Corall.</i>	Exp. 1.	ibid.
<i>Of the Gathering of Manna.</i>	Exp. 1.	ibid.
<i>Of Correcting of Wines.</i>	Exp. 1.	ibid.
<i>Of Bitumen, one of the Materialls of Wilde-Fire.</i>	Exp. 1.	pag. 203
<i>Of Plaster growing as hard as Marble.</i>	Exp. 1.	ibid.
<i>Of the Cure of some Vicers and Hurts.</i>	Exp. 1.	ibid.
<i>Of the Healthfulnessse or Unhealthfulnessse of the Southerne Wind.</i>	Exp. 1.	ibid.

The Table.

Of Wounds made with Brasse, and with Iron. Exp. 1.	ibid.
Of Mortification by Cold. Exp. 1.	pag. 204
Of Weight. Exp. 1.	ibid.
Of Super-Natation of Bodies. Exp. 1.	ibid.
Of the Flying of Vnequall Bodies in the Aire. Exp. 1.	ibid.
Of Water that it may be the Medium of Sounds. Exp. 1.	pag. 205
Of the Flight of the Spirits upon odious Objects. Exp. 1.	ibid.
Of the Super-Reflexion of Echo's. Exp. 1.	ibid.
Of the Force of Imagination imitating that of the Sense. Exp. 1.	pag. 206
Of Preservation of Bodies. Exp. 1.	ibid.
Of the Growth, or Multiplying of Metalls. Exp. 1.	ibid.
Of the Drowning the more base Metall in the more Pretious. Exp. 1.	ibid.
Of Fixation of Bodies. Exp. 1.	pag. 207
Of the Restlesse Nature of Things in Themselves, and their Desire to Change. Exp. 1.	ibid.

Century. IX.

O f Perception in Bodies Insensible, tending to Naturall Diminution, and Subtill Trialls. Exp. 30.	pag. 211
Of the Causes of Appetite in the Stomach. Exp. 1.	pag. 217
Of Sweetnesse of Odour from the Rain-Bow. Exp. 1.	ibid.
Of Sweet Smells. Exp. 1.	pag. 218
Of the Corporeall Substance of Smells. Exp. 1.	ibid.
Of Fetide and Fragrant Odours. Exp. 1.	ibid.
Of the Causes of Putrefaction. Exp. 1.	pag. 220
Of Bodies unperfectly Mixt. Exp. 1.	ibid.
Of Concoction and Crudity. Exp. 1.	ibid.
Of Alterations, which may be called Mutations. Exp. 1.	pag. 221
Of Bodies Liquefiable, and Not Liquefiable. Exp. 1.	pag. 222
Of Bodies Fragile and Tough. Exp. 1.	ibid.
Of the two Kindes of Pneumaticalls in Bodies. Exp. 1.	pag. 223
Of Concretion and Dissolution of Bodies. Exp. 1.	ibid.
Of Bodies Hard and Soft. Exp. 1.	ibid.
Of Bodies Ductile, and Tensile. Exp. 1.	pag. 224
Of Seuerall Passions of Matter, and Characters of Bodies. Exp. 1.	ibid.
Of Induration by Sympathy. Exp. 1.	pag. 225
Of Honey and Sugar. Exp. 1.	ibid.
Of the Finer sort of Base Metalls. Exp. 1.	ibid.
Of certaine Cements and Quarries. Exp. 1.	ibid.
Of the Altering of Colours in Haives and Feathers. Exp. 1.	pag. 226
Of the Differences of Living Creatures, Male and Female. Exp. 1.	ibid.
Of the Comparative Magnitude of Living Creatures. Exp. 1.	pag. 227

The Table.

<i>Of Producing Fruit without Coare or Stone. Exp. 1.</i>	ibid.
<i>Of the Melioration of Tobacco. Exp. 1.</i>	ibid.
<i>Of Generall Heats working the same Effects. Exp. 1.</i>	pag. 228
<i>Of Swelling and Dilatation in Boiling. Exp. 1.</i>	ibid.
<i>Of the Dulcoration of Fruits. Exp. 1.</i>	ibid.
<i>Of Flesh Edible, and not Edible. Exp. 1.</i>	pag. 229
<i>Of the Salamander. Exp. 1.</i>	ibid.
<i>Of the Contrary Operations of Time, upon Fruits and Liqueurs. Exp. 1.</i>	pag. 230
<i>Of Blowes and Bruises. Exp. 1.</i>	ibid.
<i>Of the Orris Root. Exp. 1.</i>	ibid.
<i>Of the Compression of Liqueurs. Exp. 1.</i>	ibid.
<i>Of the working of Water upon Aire Contiguous. Exp. 1.</i>	pag. 231
<i>Of the Nature of Aire. Exp. 1.</i>	ibid.
<i>Of the Eyes and sight. Exp. 7.</i>	ibid.
<i>Of the Colour of the Sea, or other Water. Exp. 1.</i>	pag. 233
<i>Of Shell-fish. Exp. 1.</i>	ibid.
<i>Of the Right Side, and the Left. Exp. 1.</i>	ibid.
<i>Of Frictions. Exp. 1.</i>	ibid.
<i>Of Globes appearing flat at distance. Exp. 1.</i>	pag. 234
<i>Of Shadowes. Exp. 1.</i>	ibid.
<i>Of the Rowling, and Breaking of the Seas. Exp. 1.</i>	ibid.
<i>Of the Dulcoration of Salt Water. Exp. 1.</i>	ibid.
<i>Of the Returne of Saltnesse in Pits by the Sea-Shore. Exp. 1.</i>	ibid.
<i>Of Attraction by Similitude of Substance. Exp. 1.</i>	pag. 235
<i>Of Attraction. Exper. 1.</i>	ibid.
<i>Of Heat under Earth. Exp. 1.</i>	ibid.
<i>Of Flying in the Aire. Exp. 1.</i>	ibid.
<i>Of the Scarlet Dye. Exp. 1.</i>	ibid.
<i>Of Maleficiating. Exp. 1.</i>	ibid.
<i>Of the Rise of Liqueurs, or Powders, by means of Flame. Exp. 1.</i>	pag. 236
<i>Of the Influences of the Moone. Exp. 8.</i>	ibid.
<i>Of Vinegar. Exp. 1.</i>	pag. 238
<i>Of Creatures that sleepe all Winter. Exp. 1.</i>	ibid.
<i>Of the Generating of Creatures by Copulation, and by Putrefaction. Exp. 1.</i>	ibid.

Century. X.

O <i>F the Transmission and Influx of Immaterial Vertues, and the Force of Imagination; whereof there be Experiments Monitory three; In all. Exp. 11.</i>	pag. 241
<i>Of Emission of Spirits in Vapour, or Exhalation, Odour-like. Exp. 26.</i>	pag. 246

The Table.

<i>Of Emissions of Spirituall Species, which affect the Senses.</i>	Exp. 1.	pag. 250
<i>Of Emission of Immaterial Vertues, from the Mindes, and Spirits of Men, by Affections, Imagination, or other Impressions.</i>	Exp. 21.	ibid.
<i>Of the Secret Vertue of Sympathy, and Antipathy.</i>	Exp. 39.	pag. 257
<i>Of Secret Vertues and Proprieties.</i>	Exp. 1.	pag. 265
<i>Of the Generall Sympathy of Mens Spirits.</i>	Exp. 1.	pag. 266

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Faults escaped in the Printing.

PAge 6. line 28. latter, reade later. p. 18. l. 10. Quilt, r. Quilts. p. 32. l. 37. Amalgama, r. Amalgma. p. 93. l. 35. lose, r. lost. p. 122. l. 3. Coppies, r. Coppice. p. 139. on the Top of the Leaf, wanteth part of the Title; Rudiments of Plants, and of the Exerescences of Plants, or Super-Plants. p. 222. l. 5. in redundat.

The Table.

Of the General Sympathy of Men's Spirits. Exp. 1.
Of Secret Virtues and Properties. Exp. 11.
Of the Secret Virtue of Sympathy and Antipathy. Exp. 39.
Of the Sympathy, Imagination, and other Impressions. Exp. 41.
Of the Sympathy of Immortal Spirits, from the Bodies, and Spirits of Men, &c.
Of the Sympathy of Spiritual Spirits, which affect the Senses. Exp. 1. pag. 250

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Written by the Right Honourable, FRANCIS
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